AVIATION WEEK

JULY 24, 1950

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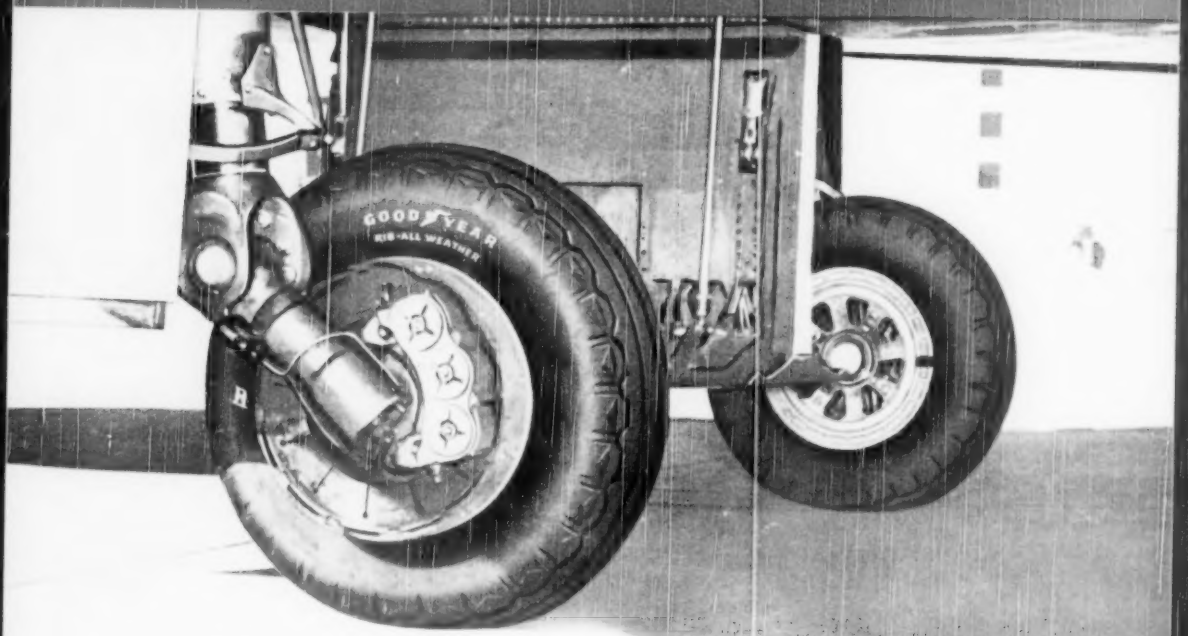

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10 MAJOR COMPANIES USE

Honeywell Electronic Fuel gage on 27 Models!

Honeywell electronic fuel gage for the Fairchild Republic capacitance type gage

Over Honeywell's entire aeronautical line, power includes the Sabre, Rangoon and the Sabre Jet. Electric motor shown.

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It is such far reaching operations that have firmly established Honeywell as a producer of highly engineered aeronautical equipment. Minneapolis-Honeywell, Minneapolis 8, Minnesota. In Canada: Leaside, Toronto 17, Ontario.

MINNEAPOLIS
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AERONAUTICAL CONTROLS

Not the least important feature of a well designed self-sealed ball bearing mounting is the years of service that may be expected. But add to this the fact that bearing maintenance over this period is brought down to the vanishing point and you have some of the reasons for the increasing trend to ball bearings.

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NEW DEPARTURE · Division of GENERAL MOTORS CORPORATION · BRISTOL, CONNECTICUT · BRANCHES IN ALL PRINCIPAL CITIES

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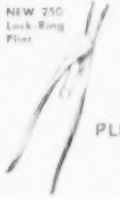

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Aviation Week

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Volume 53 July 24, 1950 Number 4

Headline News

Industry to Double Plane Output 12
Action Starts on Plane Production ..13
Turbo Liners 15
Procurement Responsibility Assigned 15
Boeing Testing 16
Air Force Position Is Defined 17

Equipment

Purging Lessens Explosion Hazard 18

Production

Air Force Contract Information 20

Aeronautical Engineering

Along P & W's Jet Production Line 22

Avionics

Stick-Force Indicator for Testing 34

Aviation Sales & Service

Tyler Grows With Spray Boom 39

Financial

Merger and Company Finances 46

Air Transport

Trans-Atlantic Test: PAA vs. TWA 45
Korea Airlift 48
Center-Line Test 50

Editorials

Can We Help You? 58
More Comment on Pullman 58

Departments

Picture Page 7
Aviation Calendar 8
News Digest 9
Who's Where 11
Industry Observer 11
New Aviation Products 19
What's New 56
Production Briefing 21
Briefing for Dealers 39
Letters 40
Shortlines 53
CAB Schedule 54
Strictly Personal 56

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Domestic News Bureaus: Atlanta 3, Rhodes-Haverty Bldg., Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 17, 1111 Wilshire Blvd.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents* in more than 60 major cities.

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Aviation Week July 24, 1950 Vol. 53, No. 4

McGRAW-HILL PUBLISHING CO., Inc. James H. McGraw (1860-1948), Founder. Publication office—99-129 N. Broadway, Albany, N. Y. CURTIS W. McGRAW, President; WILLARD CHEVALIER, Executive Vice-President; JOSEPH A. GERARDI, Vice-President and Treasurer; JOHN J. COborn, Secretary; H. J. McCREADY, Senior Vice-President; Publication Division; RALPH B. SMITH, Executive Vice-President and Director of Advertising; J. E. BLACKBURN, Jr., Vice-President and Director of Circulation. Published weekly in U. S. A. price 35¢ a copy. Sold in Canada. Subscription price—United States and possessions, $6 a year, $9 for 2 yr., $12 for 3 yr. Canada, $9 for 1 yr., $17 for 2 yr., $16 for 3 yr. payable in Canadian currency at par. Pan American countries, $10 for 1 yr., $18 for 2 yr., $26 for 3 yr. All other countries, $20 for 1 yr., $36 for 2 yr., $48 for 3 yr. Address all correspondence about subscriptions to 99-129 N. Broadway, Albany, N. Y., or Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Please indicate position and company connection on all subscription orders. Allow 4 weeks for change of address. Entered as second class matter Feb. 28, 1947, at the Post Office, Albany, N. Y., under Act of March 3, 1879.

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Now comes the news that AiResearch equipment will be used to pressurize and air condition the fleet of 10 new super Constellations ordered by Eastern Air Lines. This follows closely on the heels of the announcement that AiResearch equipment will be used on the fleets of new model Martin 4-0-4's purchased by Eastern and Trans World Airlines.

As Captain Eddie Rickenbacker, President and General Manager of Eastern Air Lines, says, "With new engineering advancements in air conditioning and temperature control, the Super-New-Type Constellation will become the most pleasant passenger air liner in the world to fly at any altitude . . ."

The AiResearch system for each airplane comprises approximately 25 individual components, all integrated to produce and control a cabin air flow of 140 pounds of air per minute, 40 pounds more than in the #649 and #749 Constellations. Major components, which include two cabin superchargers, two turbine refrigeration units and two cabin pressure regulators, will be similar *and largely interchangeable* with those used in the AiResearch-equipped Martin 4-0-4.

Into the design, engineering and manufacturing of this equipment goes more than a decade of experience. *Only* AiResearch has this backlog of "know how" and skilled manpower which already has created pressurizing and air-conditioning equipment for a majority of all post-war military and commercial aircraft.

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AIRESEARCH MANUFACTURING COMPANY, LOS ANGELES 45, CALIFORNIA

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Among the many companies that have purchased a Sperry Zero Reader for their executive aircraft are:

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- W. R. Carpenter—Beechcraft
- Avco Manufacturing Corp.—Lockheed Lodestar
- Texas Eastern Transmission Corp. Douglas DC 3
- Briggs Manufacturing Co.—Grumman Mallard
- Champion Spark Plug Co.—Beechcraft
- Gaylord Container Corp.—North American B-25 and Beechcraft
- C. F. Kettering, Inc.—Grumman Mallard
- Union Producing Co.—Douglas DC 3 and Lockheed Lodestar
- General Electric Co.—Douglas B 23
- The Fuller Brush Co.—Grumman Mallard
- General Mills, Inc.—Douglas DC 3
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- Arthur Godfrey Productions, Inc. Douglas DC 3
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• Developed by Sperry with the cooperation and encouragement of All-Weather Flying Division, USAF, and the Air Transport Association, the Zero Reader is finding wide acceptance with leaders in industry who find it profitable to have their own aircraft. And the pilots of these planes are getting new assurance of on-schedule flying and landings with this instrument. They find that the actual job of piloting and making manual instrument approaches is greatly simplified.

• The Zero Reader supplies information from five essential instruments . . . presents all this data on one indicator—heading, altitude, attitude, and instrument landing information. The pilot merely "zeros" two instrument pointers and is relieved of all complex mental calculations. The difficult task of making a manual approach on Instrument Landing Systems becomes a routine procedure.

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News Picture Highlights . . .

NEW BRITISH FASHION MODELED AT PARIS

Britain's new English Electric Canberra jet bomber swoops low over Orly Field, Paris, to show spectators its novel finger-type dive brakes extended beneath wings. The twin-Avon powered two-seater is now in quantity production for the RAF.

NOVEL RACER TRIES ITS WINGS

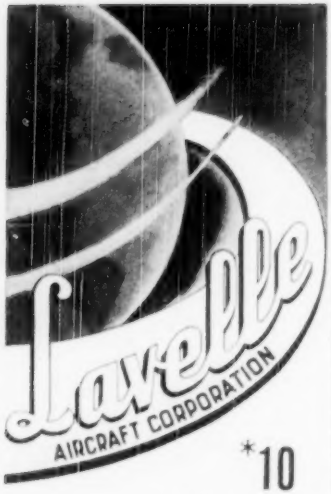
The PAR Special pusher midget racer, developed as a spare-time project by four McDonnell Aircraft engineers, shows off its twin tandem landing gear, underwing intakes, exhaust thrust augmentor tubes, V-type tail, and wingtip auxiliary wheels.

COPTERS NEST ON CARRIER

U.S.S. Palau sports eight Piasecki HRP-1 tandem-rotor copters lined up on its flight deck ready for loading combat troops and equipment.

NEW USAF TRAINERS

Fourteen North American T-28 advanced trainers line up at the company's Los Angeles plant prior to delivery to the USAF. The 800-hp. Wright-powered craft will prepare AF neophytes for jet planes. Note T-28's huge cockpit canopies and large flaps, also sectioned engine cowling.



*10

EXAMPLE PROJECTS

*6

RADAR SHELTER

Problem:

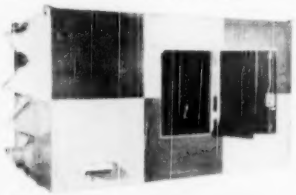
Completely design, build and test a quantity of strong, light weight, water tight shelters not to exceed 3000 pounds to accommodate three men and equipment.

Solution:

Solved by application of air-frame design and manufacturing experience utilizing aluminum, steel, wood, textiles, glass insulation, wiring conduit, masonite, linoleum, paint, heaters, ventilators and assorted hardware.

Result:

A rugged shelter fully appointed weighing only 2150 pounds—a saving of 850 pounds.



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EXPERT FABRICATORS OF METAL AIRCRAFT PARTS

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AIRCRAFT CORPORATION

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AVIATION CALENDAR

July 10-28—Air Age Institute lecture series, Parks Air College, E. St. Louis, Ill.

July 26—25th Anniversary Celebration, Pratt & Whitney Aircraft division, United Aircraft Corp., Rentschler Airport, East Hartford, Conn.

July 29-30—Corpus Christi Air Fiesta sponsored by American Legion, Cuddihy Field, Corpus Christi, Tex.

Aug. 2-13—17th National Soaring Contest, Grand Prairie, Texas.

Aug. 7—Lions Club Air Meet, Sky Harbour Airport, Goderich, Ontario, Canada.

Aug. 7-18—Special two-week program on high temperature ceramics, Massachusetts Institute of Technology, Cambridge, Mass.

Aug. 7-20—First United States International Trade Fair, Chicago.

Aug. 19—Tennessee air progress conference, Knoxville.

Aug. 19-20—California Air Freight Clinic, sponsored by Calif. Aeronautics Commission and Oakland Chamber of Commerce Aviation Committee, Oakland.

Aug. 25-27—Fourth Annual Air Force Association convention, Hotel Statler, Boston.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Sept. 7—Pratt & Whitney distributor operation and maintenance meeting, Pacific Airmotive Corp., Linden, N. J.

Sept. 9-10—Third annual convention of the California Wing of the Air Force Assn., Arrowhead Springs Hotel and Spa near San Bernardino, Calif.

Sept. 10-14—Instrument Society of America instrument conference and national exhibit, the Coliseum, Houston, Tex.

Sept. 12-14—Conference on ground facilities for air transportation, Massachusetts Institute of Technology, Cambridge, Mass.

Sept. 18-22—Fifth national instrument conference and exhibit, Memorial Auditorium, Buffalo, N. Y.

Sept. 28-30—14th annual convention of International Northwest Aviation Council, Sun Valley, Idaho.

Oct. 12-13—1950 conference on airport management and operations, Max Westheimer Field, North Campus, University of Oakland, Norman, Okla.

Oct. 16-20—1950 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

Oct. 25-26—Flight Safety Foundation annual Safety Seminar, Denver, Colo.

Oct. 26-27—5th annual aviation conference, sponsored by aviation committee of Tucson Chamber of Commerce.

PICTURE CREDITS

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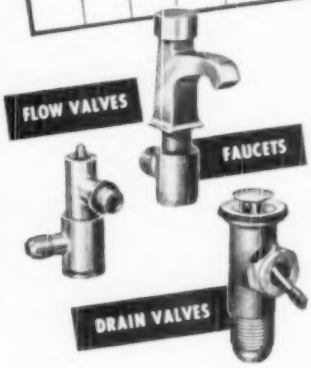
SANITARY PLUMBING

BY ADAMS-RITE



These flow and drain valves and faucets are among many designs manufactured by Adams-Rite for both air frame manufacturers and air lines for galley and lavatory use. Like other Adams-Rite products, they are recognized by the industry for *better* design and highest quality.

All Adams-Rite flow valves are new made of stainless steel to assure continuous operation irrespective of water conditions. A 360° swivel base permits inlet plumbing from any direction. Several types of easily installed drain valves and faucets which adequately meet sanitary requirements are also available.

Write today for full information on these production units or we will be glad to provide engineering assistance on special designs.

ADAMS-RITE LOCKS AND CLOSURE DEVICES ARE UNIVERSALLY USED

Adams-Rite also is the acknowledged headquarters for locks, latches and closure devices to secure fuselage, compartment, lavatory, galley and bulkhead doors. A comprehensive catalog of Adams-Rite locks, handles, escutcheons and other items is available to the industry and engineering assistance is yours for the asking.

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NEWS DIGEST

DOMESTIC

Air Force will handle one-third of the $1 billion in European military aid for fiscal 1951. AF will take care of training and purchase of planes, aircraft parts and equipment for our MDAP allies. This disclosure by Sen. Millard Tydings, chairman of the Senate Armed Services Committee, is seen as further recognizing importance of air support for ground operations. In fiscal 1950, only $86 million of the $1 billion in military aid furnished Western Europe was handled by the Air Force, compared with the $309 million for 1951.

A new midget plane race cup and purses totaling $5000 have been put up by Tennessee Products and Chemical Corp., Nashville, aviation equipment makers. The new competition, sanctioned by NAA and CAA, was scheduled for the National Pilots' Meet Chattanooga last week.

Republic Aviation Corp. purchased for $5,332,000, the government-owned land and buildings operated by the company at Farmingdale, N. Y., since the early days of World War II. The deals adds about 1.5 million sq. ft. of plant area to company-owned facilities in addition to the airport and hangar areas. Down payment was $1,066,554.87 and approximately $426,732 is to be paid annually until the end of June 1960. The company also completed payment for $1,330,072 in machinery and equipment purchased from the government three and one-half years ahead of schedule.

CAA's closing down of "unnecessary" intermediate fields and beacons (AVIATION WEEK June 19) has evoked a strong protest from the Aircraft Owners and Pilots Assn. J. B. Hattrantt, Jr., AOPA general manager, has written CAA Administrator Rentzel asking for an investigation into the possibility of continuing operation of these facilities.

Earl W. Hill, former professor of commercial aviation at the University of California, died at his Hollywood home July 3. The nationally known expert of air transport was 67 years old. He founded and was national president of Alpha Eta Rho, aviation fraternity.

Republic F-84E jet fighter was in the air for 23 hr. 5 min. out of a 24-hr. period during an accelerated service test program at Wright Field last week. The plane was one of 15 being tested at AMC headquarters, at Turner AFB and at Bergstrom AFB, to see if the lubrication fix on the plane's Allison J-35-A-15 engine was satisfactory (see Industry Observer).

McDonnell XF-88A Voodoo caught fire in mid-air at Edwards AFB during its 102nd flight and skidded to a belly landing. No information is available concerning damage suffered as a result of the incident. The afterburned twin jet is one of three types participating in the AF's evaluation of a suitable escort fighter.

Aerotec Corp. and Thermix Corp. of Greenwich, Conn., have been declared by RFC to be the successful bidders for land, building, equipment, stock, tools, designs and patents of the bankrupt Warren McArthur Corp. of Rantam, Conn. A new firm has been organized to operate the 200,000-sq. ft. plant and resume manufacture of McArthur seats as soon as possible. Aerotec engineers, designs and manufactures aircraft valves, and pressure switches, as well as industrial dust-collecting equipment. Thermix is the sales and project engineering organization for these products.

Joint Secretaries Staff is new group combining secretaries of Army, Navy and Air Force. Function is to achieve faster coordination of policy matters affecting the three services. The group will also handle matters that have wide international political implications beyond the purely military matters confronting the Joint Chiefs. Recommendations made by the Joint Secretaries are referred to Defense Secretary Johnson for final action unless the matter can be acted on within an individual secretary's department.

Representatives of 15 principal civil aviation organizations discussed civil aviation's place in the present world crisis and threat of World War III at Washington meeting last week, chairmanned by George Haddaway, publisher of Southern Light. Original purpose of meeting had been to plan concentration of aviation meetings at one time and place.

INTERNATIONAL

A special grant of $3 million has been requested by the Brazilian Ministry of Aeronautics to cover 1951 expropriation costs attendant on the expansion of Sao Paulo's military air base at Cumbica.

AIRCRAFT RADIO CORPORATION

VHF communication and LF navigation systems

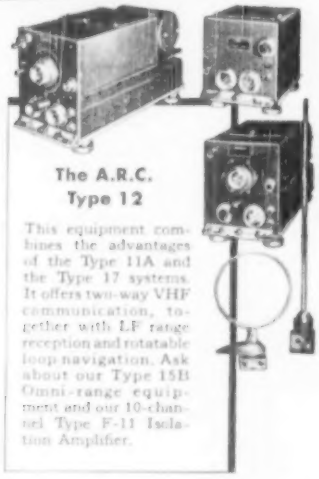
Meet Every Operational Need for Single and Twin-Engine Aircraft

The A.R.C. Type 11A

This system is designed to meet basic needs by providing for VHF transmission, LF range reception, and rotatable loop navigation.

The A.R.C. Type 17

This system introduces two-way VHF equipment. It includes a tunable VHF receiver and a five-channel, crystal controlled VHF transmitter. As many as three of these transmitters may be installed, thus providing up to 15 channels.



The A.R.C. Type 12

This equipment combines the advantages of the Type 11A and the Type 17 systems. It offers two-way VHF communication, together with LF range reception and rotatable loop navigation. Ask about our Type 15B Omni-range equipment and our 10-channel Type F-11 Isolation Amplifier.

All units of these systems are type-certificated by the CAA. For the highest standards of design and manufacture in radio equipment, specify A.R.C.

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ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION
BRIDGEPORT CONNECTICUT

SIKORSKY Helicopter NEWS

Over the portals of the U. S. Post Office building in New York is this inscription: "Neither snow nor rain nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds". We can paraphrase that and say that neither fog nor smog nor overcast nor gloom of night now stays Sikorsky helicopters from the swift completion of their appointed rounds on the pioneering mail route operated by Los Angeles Airways.

The C.A.A. has certificated Los Angeles Airways, using Sikorsky helicopters, for flying under instrument conditions.

For more than a year preceding the C.A.A. action, scores of test flights on instruments and many successful landings in zero-zero weather were made. Of equal importance is the unparalleled record of two and one-half years of safe, dependable operation of these Sikorsky helicopters by Los Angeles Airways.

Instrument flight operation is another significant milestone in the progress of this versatile aircraft, which less than a dozen years ago could barely leave the ground under full power.

The C.A.A. certificate extends only to Sikorsky S-51 helicopters used on the Los Angeles air mail route, but it is safe to predict that, because the way has been paved, helicopter instrument flight certificates will be extended to other areas.

SIKORSKY AIRCRAFT

Bridgeport, Connecticut

WHO'S WHERE

In the Front Office

Donald M. Latham will head the industrial modification planning dept. at Bell Aircraft Corp., Buffalo. Latham came to the company from the sales dept. of Canadair, Ltd., and was previously connected with the Air Materiel Command's industrial planning division at Wright Field. During World War II he represented Lockheed as the B-17 production committee and was manager of Lockheed's Seattle office.

Colin H. McIntosh has been named vp operations for All American Airways. He has been director of operations for the carrier since Dec. 1948, and previously to joining AAA was with Charles A. Rinaldi Inc. aviation consultants, where he assisted in developing a base program for AAA's then proposed passenger operations in the Mid-Atlantic Area. He was recently elected president of Air Transport Assn.'s operations conference.

Honors and Elections

IAS AWARD WINNER—Coast Guard Commander Donald B. MacDiarmid, USN, winner of the 1950 Octave Chanute Award for outstanding contributions to air rescue techniques, is greeted by J. H. Kindelberger, North American Aviation head and IAS prev., at Los Angeles. Cmdr. MacDiarmid received the honor at the Institute's dinner in Los Angeles on July 13. The dinner also featured receipt of the Thurman H. Bane Award by Col. George W. Goddard, USAF, for development of a new type of low altitude night photography.

Changes

Howard E. Roberts has been appointed chief engineer for American Helicopter Co.

Francis E. Furman has been made gen. sales manager for General Electric's large apparatus division. ..... **A. L. Pomeroy** has been named director of development for Thompson Products.

INDUSTRY OBSERVER

► Eleven Allison J35-A-17 turbojets incorporating new fuel lubication changes to correct persistent difficulties with the engine's No. 2 bearing have passed 50-hr. Air Materiel Command Tests. The trouble was responsible for the two-time grounding of the Republic F-84E. Tinker AFB, Oklahoma City, is handling engine modification for F-84Es now in service, while Allison is correcting engines now on the production lines and some returned by Republic. The engine difficulties have been the principal reason that the airplane, regarded as the USAF's best ground support fighter, has not been on its way to Korea.

► Watch for future multiple installations of jet engines in single nacelles in new designs. Boeing's B-47C jet bomber will have the engines in four separate pods slung under the wing at equal intervals for better weight distribution. Secondary advantage is a safety measure, to prevent trouble in one jet engine from disabling another in the same pod. Experience with the B-47 has not shown that this is necessary, but it is an added precaution.

► Pan American Airways pilots are reported conducting an ALPA strike poll as a result of dissatisfaction with through-flight arrangements between PanAm and Panagra. Under the "trackage agreement" recently made, Panagra planes are chartered by PAA with their crews, at Balboa, Canal Zone, on arrival from points farther south. Then planes and chartered crews fly over PAA's certificated route to Miami, pilots say, taking work away from the PanAm crews. Pilots fear that PAA plans more such through-flight arrangements, and also contend that grievance machinery is not functioning properly.

► Glenn L. Martin Co. is completing wind tunnel tests at Massachusetts Institute of Technology of a scale model of the new 4-D-4 transport, with about 10 ft. wingspan. It is complete in external detail down to four-blade propellers and carefully shaped engine nacelles.

► NACA studies of the explosive noises recently reported caused by jet fighters at Wright Field indicate the second theory advanced by Wright Field engineers—that the noises were caused by soundwaves following the planes, intensified by pullouts after dives—is correct, rather than the earlier afterburner theory. It was learned that the noise phenomenon was experienced with planes not equipped with afterburners, such as the North American F-86 fighter. Afterburner-carrying planes developed from the F-86, such as the North American F-95A and the F-93, were not at Wright Field at the time the noise phenomenon was reported.

► Avro Canada Ltd. last week began test flights with two new Avro Orenda turbojets in outboard nacelles of a Lancaster flying testbed plane. The engine has been unofficially rated at over 7000-lb. thrust, but the manufacturer's most specific statement as to power is that it is "one of the most powerful in the world." The Lancaster is modified for long-range cold weather testing in the Canadian North. It has two Rolls-Royce Merlin piston engines in inboard nacelles.

► De Havilland propeller engineers claim their new eight-blade dual rotation propeller, built for use with the coupled Proteus turboprop engines rated at 6400 equivalent shaft hp., is the largest turbine propeller yet built anywhere. It is designed for use on the Saunders-Roe Princess which uses eight Proteus engines in four coupled installations and two Proteus engines in single nacelles.

► Latest gimmick in the highly competitive scramble for basic and primary trainer contracts is official indication that no production order will be awarded as a result of training evaluation started at Randolph Field this week. The Air Force training evaluation involves actual training of cadets for six months in the three competing trainers—Fairchild T-51, Beechcraft T-34, and FEMCO T-35—as against the standard North American T-6 trainer. Navy will conduct similar test at Pensacola. Result will be used to produce a new set of specifications for a future trainer design competition, rather than to award any contracts for the contemporary models.

AVIATION WEEK

VOL. 53, NO. 4

JULY 24, 1950

Airpower Expansion Statistics

President Truman's emergency request for total new U. S. military funds	$10 billion
AVIATION WEEK estimate of Air Force share	$ 3.5 billion
For Procurement	
AVIATION WEEK estimate of new procurement allotment from Air Force share	$ 1.6 billion
Allocation already agreed upon by Congress for 1951 Air Force procurement	$ 1.5 billion
Total estimated to be appropriated for 1951 Air Force procurement	**$ 3.1 billion**

Industry To Double Plane Output

Truman message to Congress virtually assures 70-group Air Force strength.

U. S. military plane production is headed for expansion to at least double its present rate as rapidly as the aviation industry can grow to this new goal.

President Truman's July 19 message asking Congress for $10 billion for the U. S. military establishment, because of the Korean situation and other world conditions, virtually assures this.

Official breakdown on the Air Force share of the $10 billion was due to be presented in a specific Defense Department appropriation request being prepared at the Pentagon last week.

▶ **Air Force Share**—However, AVIATION WEEK learned that the Air Force allotment was expected to be approximately $3.5 billion, a little more than a third of the total amount.

Of this, it is expected that $1.6 billion will go for aircraft procurement, the remainder for recruiting and training new personnel and other expenses.

▶ **Double Force**—The additional procurement funds, virtually doubling the planned 1951 Air Force procurement budget, are aimed at boosting the present inadequate 48-group Air Force as rapidly as possible to the 70-group strength long advocated by U. S. aviation experts.

The President's Air Policy Commission report, issued two years ago, called for a 70-group Air Force in being at 12,400 first line planes plus an 8100-plane reserve to meet combat losses and other attrition.

▶ **Guidebook**—With Thomas K. Finletter who headed that commission now Air Force Secretary, it is expected that the commission report, with requirements up-dated where needed to meet current needs, will be a hands guidebook on the expansion program for the aviation industry.

Air Force funds not earmarked for procurement will go to build-up of the depleted Air Force personnel roster and to increased operational expenses.

▶ **Recruiting Program**—It is understood that the Air Force now has first-line planes available to step up its strength to 52 groups immediately, but lacks the air crews and ground maintenance crews for them. Probably first priority on the recruiting program will be to man these additional groups.

To build up USAF to full 70-group strength, approximately 150,000 additional officers and men will be required to boost the total to around the 500,000 mark. This is still only a fraction of the giant World War II Army Air Force which ran well over the 2 million mark in personnel at its zenith.

To help the defense plants of the nation mobilize swiftly to fill the needs of the military services on the new expanded scale, President Truman asked Congress for authorization to put in new priorities systems for allocating materials and supplies as needed.

To boost the manpower of Air Force, Navy and Army, President Truman announced he has authorized calling into active service as many national guard units and reserve forces as may be required, and recommended that Congress lift the present statutory limit on the total strength of the armed forces—2,005,000 men—so that it may be set at any desired level.

The President made it clear that the $10 billion asked for the U. S. armed services was a separate amount from any military defense aid to other nations, and that the yet undisclosed amount to be allocated for their assistance would be an additional sum.

The U. S. aircraft industry was expected to get its first official breakdown late last week on what was to be expected from various companies.

▶ **Pentagon Meeting**—Air Force Undersecretary John A. McCone, was scheduled to meet with the heads of principal aircraft and engine companies at the Pentagon to lay out the requirements of the new program. Much of the groundwork for aircraft industry expansion has already been laid in industrial mobilization planning and in advance indications to the industry, in anticipation of the President's message. (See accompanying story on industrial mobilization.) But much of the details of beginning expansion could only be guessed at until the figures involved were actually "laid on the line."

The additional Air Force procurement funds, unofficially estimated at around $1.6 billion, added to the $1.5 billion already allocated for the Air Force procurement for 1951 fiscal year (AVIATION WEEK July 17), will bring the total amount available for Air Force procurement over the $3-billion mark.

▶ **Navy Procurement**—In addition to Air Force procurement of aviation materials, there is expected to be a sizeable increase in Naval aviation procurement, the amount of which could not yet be estimated last week.

Navy was to get $733 million for plane procurement in 1951 under terms of the congressional budget approval earlier this month, and whatever new funds for Naval air were allocated out of the congressional budget approval would be additional. It appeared likely that the total fund for additional Navy airpower would be boosted well above the billion mark.

Production Contrast

Present U. S. monthly aircraft production rate of 215 planes is but a sliver of peak military output during World War II. Some key dates and rates:

Date	Monthly Rate
Sept., 1939. Hitler invades Poland	**117**
May, 1940. Roosevelt calls for 50,000 warplanes	**450**
Dec., 1941. Pearl Harbor	**2461**
Mar., 1944. Peak wartime plane output	**9113**
Average for 1946-1947. Postwar low	**130**
July, 1950. Korean Crisis	*215*

Action Starts on Plane Production

New complex problems face industry as manufacturers prepare to increase output of modern military craft.

By Alexander McSurely

A major expansion of U. S. military plane production was already under way last week as President Truman, Congress and the nation faced up to the Korean crisis and its potential aftermath.

Even in advance of the Truman message the U. S. plane makers had started to move, spurred by Air Force and Navy unofficial indications of expanding contracts.

But it won't easy.

▶ **Four Times As Hard**—Building a 1950 plane is about four times as difficult as building a 1940 one. Or, to say it another way, if the plane makers used the same amount of manpower, tooling and material, plant space and production knowhow, the 1950 production would be about one-fourth that built 10 years ago.

The difference is well explained in the comparison of J. H. "Dutch" Kindelberger, North American Aviation board chairman, between the F-51 fighter of World War II and the F-86 jet fighter of today's first line Air Force.

▶ **Thin Wing**—"On the F-51 our wing thickness at the root was 15 percent of the width. Today this thickness ratio on jet fighters is down below 10 percent and if we made them thicker we would run into drag and Mach number troubles.

"The box structure of the F-51 wing at a point where the load is transmitted to the fuselage had to withstand a stress of about 4500 lb. per running inch. In the F-86 wing the same region must take a load of about 28,000 lb. per running inch, or almost seven times the force. . . . making airplanes smaller on the outside and stronger on the inside meant thicker sheets, harder materials . . . that many parts that formerly were bent into shape must now be machined into shape . . . more complicated structures and joints . . . more difficult riveting methods . . . more and better assembly tooling . . .

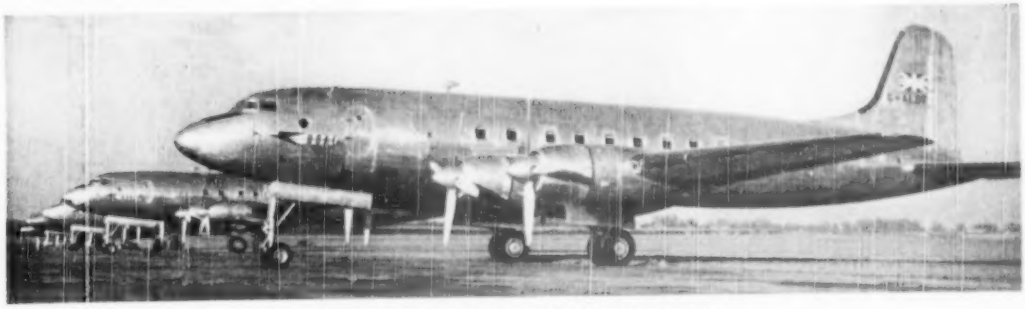
▶ **Double Production**—Industry sources last week estimated that the U. S. plane manufacturers could produce a little more than double their present production by stepping up to a round-the-clock shift basis, with present plants and tooling. How long this would take was strictly a guess. It depends on such factors as:

- **Ability of suppliers** to provide components at the stepped-up rate.
- **Ability to double** the supply of materials.
- **Ability to get and train** the additional manpower needed.

Aircraft Industry Assn. reported that monthly production as of July 1950 amounted to only 215 planes a month, and that an all-out production effort from this level, could be expected to triple production within a year. (This is based on a "rule of three" developed from study of World War II production expansion.) This would assume use of additional plants, more tooling and all other means in addition to the increased manpower and materials previously mentioned.

▶ **Early Step-ups**—Typical of early industry step-ups reported last week were:

- **Republic Aviation Corp.** which had called 500 of its key employees back from vacation to work on F-84E en-



HERMES GET READY FOR BUSINESS

Five Handley Page Hermes 4s are lined up in preparation for delivery to British Overseas Airways Corp. The Hermes 4 has received its Certificate of Airworthiness and is scheduled to begin regular flights from London to West Africa by the end of this month. During August and September it will go into operation on the London-Cairo service and East African routes, and in October over the Springbok route to Johannesburg. The Hermes 4 can be outfitted to handle 40-74 passengers, has a gross weight of 82,000 lb. and cruises at 283 mph. A later model, the MK. 5, has four Bristol Theseus turboprops.

gines, offered the Air Force that its other vacation employes were on standby, ready to return as soon as needed. J-47 jet ground support fighter is expected to be one of the major factors in new tactical aviation orders.

• **Allison division** of General Motors Corp., Indianapolis jet engine and tank transmission producers, canceled a two-week vacation shutdown scheduled July 31, and will give its employes extra pay instead, in order to keep the flow of jet engines going.

• **Consolidated Vultee Aircraft Corp.** announced employes were going on two 10-hr. shifts daily beginning last Monday on B-36 intercontinental bomber production.

• **Contracts were issued** by Air Force and Navy to restore "mothballed" World War II planes such as Boeing B-29s, Douglas B-26 attack bombers, and Chance Vought Corsair F4U fighters to fighting condition. (Stored in preservatives, these planes are reported in excellent condition. While not capable of performance of today's top fighters and bombers, the older planes can be thrown into action far quicker than the newer ones can be built in quantities which may be needed, and may serve until the newer planes can be provided in quantity.)

Greatest advantage U. S. war production has today over the days of 1940-1941 is in readily available plants and machine tool equipment and stockpile of critical materials.

▶ **Plants Ready**—Of approximately 1000 industrial plants of all kinds built in World War II, 468 have been kept under government control. Of these 257 can be put on an immediate wartime footing when required. An additional 200 plants are either in standby condition, or are in civilian production with a contract stipulation that they will reconvert to war production on demand within 120 days.

Seventy-two of the plants are aircraft plants or are assigned to aircraft production. Of these 36 are in a military plant reserve, either owned by Air Force or Navy, and are either on standby or leased with 120-days recall. The other 39 plants are in a national industrial plant reserve, and are likewise ready for use within a maximum period of 120 days.

Aircraft industry plant space in use now (July 1950) totals 56 million sq. ft., less than a third of that used at the peak of World War II plane production effort, 171 million sq. ft. That figure did not include outside plant space devoted to aircraft use by the automobile industry and other manufacturers. It is estimated that they built 48 percent of the airframes and 30 percent of the engines produced in World War II.

▶ **Tool Storing**—Program of "salting away" surplus World War II machine tools for future war production is expected to ease the machine tool bottleneck which slowed production in the early days of the last war. How these stored machine tools have been preserved, and how soon they can be reconditioned and ready for use is a matter which has been subject of industry criticism.

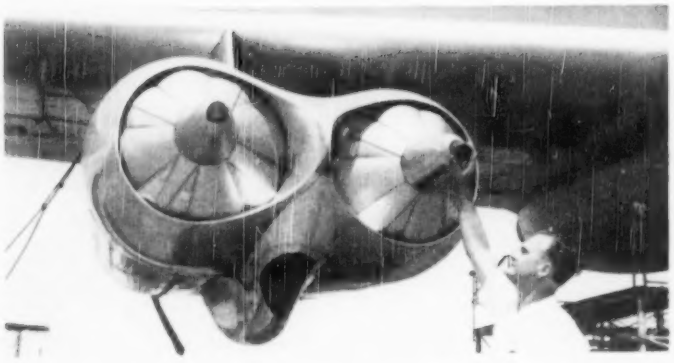
The tools stored are general purpose machine tools, and there still remains the problem of producing special purpose tooling and new types of tools developed since World War II in sufficient quantities to meet production needs.

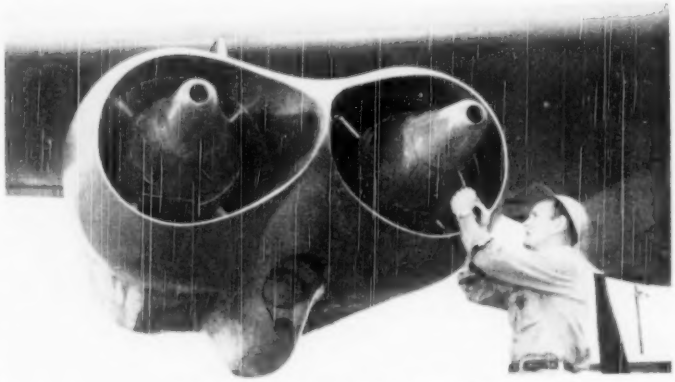
The national program of stockpiling critical materials is another asset to be reckoned in production planning. At the end of June the inventory contained more than $1.3 billion worth of materials, with additional deliveries in progress amounting to another half billion dollars.

▶ **USAF Industrial Mobilization**—How far the Air Force would go in putting into action its industrial mobilization planning was not yet known for such arrangements as licensing other plants to manufacture prime contract items as complete planes and complete engines, propellers, and hard-to-produce components.

However Air Force and Navy have made no secret of the existence of a number of such license-licensee agreements waiting to be activated if mobilization plans require. Items such as Pratt & Whitney R-4360 engine, the Wright R-1300 engine, GE J-47 and Allison J-35 jet engines, some of the Curtiss and Hamilton Standard propellers, and the North American F-86, Republic F-84, Boeing B-47 and Boeing B-50 have been announced by the Air Force as subjects of licensing arrangements. Presumably there are others.

Just where the missiles program fits into the current expansion is not yet clear. Apparently the early trend is still to place principal reliance on the airplane for offense and defense in view of the highly scrambled missiles program. Pressure to straighten this out and get some production combat missiles is expected to mount rapidly.





J-47 INTAKE FLAPS CUT DRAG

A starboard twin J-47 turbojet installation on the B-36 shows newly developed intake flaps in spread position (top) and retracted (below). Pilot keeps intakes sealed in flight when jets are not being used, thus reducing drag due to turbine windmilling; on the ground the flaps keep out foreign matter. Actuator switch is in pilot's compartment.

Procurement Responsibility Assigned

Under the postwar revision of procurement directives by the Munitions Board, procurement responsibility for aircraft and principal components has been divided between the Air Force and the Navy. Following is the most available list published for the benefit of the aviation small business group showing the procurement responsibility for various principal U. S. plants. (There are no standby engine or propeller plants listed.)

USAF Responsibility

Aircraft Manufacturing Plants

Manufacturer	Location of Plant
Aeronca	Middletown, O.
Beech	Wichita, Kan.
Bell	Buffalo, N. Y.
Boeing	Seattle, Wash.
Boeing	Renton, Wash.
Boeing	Wichita, Kan.
Chase Aircraft	Trenton, N. J.
Con. Vultee	Ft. Worth, Tex.
Cessna	Wichita, Kan.
Cessna	Hutchinson, Kan.
Douglas	Long Beach, Cal.
Fairchild	Hagerstown, Md.
Fairchild	Winfield, O.
Hughes	Culver City, Cal.
Kellett Hughes	N. Wales, Pa.
Kaiser Fleetwings	Bristol, Pa.
Lockheed, Plant B	Burbank, Cal.
North American	Inglewood, Cal.
North American	Downey, Cal.
North American	Long Beach, Cal.
Northrop	Hawthorne, Cal.
Republic	Farmingdale, N. Y.
Ryan	Van Nuys, Cal.
Sikorsky	Bridgeport, Conn.

Engine Manufacturing Plants

Manufacturer	Location of Plant
Continental	Muskegon, Mich.
General Electric	Lynn, Mass.
General Electric	Lockland, O.
Jacobs	Pottstown, Pa.
Lycoming	Williamsport, Pa.
Packard	Toledo, O.
Wright Aero	Wood-Ridge, N. J.

Propeller Manufacturing Plants

Manufacturer	Location of Plant
Aero Products	Vandalia, O.
Curtiss	Caldwell, N. J.
Hartzell	Piqua, O.
Smith, A. O.	Milwaukee, Wis.

Standby Aircraft Plants

Manufacturer	Location of Plant
Air Force Plant #3	Tulsa, Okla.
Air Force Plant #7	Cleveland, O.
Air Force Plant #31	Omaha, Neb.
Air Force Plant #32	Kansas City, Kan.
Air Force Plant #37	Oklahoma City, Okla.
Air Force Plant #6	Marietta, Ga.
Air Force Plant #28	Chicago, Ill.

Navy Responsibility

Aircraft Manufacturing Plants

Manufacturer	Location of Plant
Chance Vought	Bridgeport, Conn.
Chance Vought, Plant B	Dallas, Tex.
Ling Temco	San Diego, Cal.
Martin	Columbus, O.
Douglas	El Segundo, Cal.
Douglas	Santa Monica, Cal.
Lake	Calhoun Point, N. Y.
Curtiss Aircraft	Joliet, Ill.
Goodyear	Akron, O.
Grumman	Bethpage, N. Y.
Lockheed, Plant A	Burbank, Cal.
Martin	Baltimore, Md.
McDonnell	St. Louis, Mo.
Piasecki	Morton, Pa.
Ryan	San Diego, Cal.
LTV-LTV, Plant A	Dallas, Tex.

Engine Manufacturing Plants

Manufacturer	Location of Plant
Aerojet	Azusa, Cal.
Pratt & Whitney	Hartford, Conn.
Pratt & Whitney	Southington, Conn.
Kinner	Farmingdale, N. Y.
Reaction Motors	Lake Denmark, N. J.
Westinghouse	Lester, Pa.
Westinghouse	Kansas City, Mo.

Propeller Manufacturing Plants

Manufacturer	Location of Plant
Hamilton Standard	E. Hartford, Conn.
Koppers	Baltimore, Md.

Turbo Liners

CAA division chief discusses problems of transports of future.

Before we find our backyard full of turboprop and turbojet transports ready to be certificated, we should start arguing about some of the problems that will surely develop, George W. Haldeman, chief of the aircraft division of the CAA, told members of the IAS summer meeting in Los Angeles.

He emphasized the CAA's findings summarized in his paper, and in a report now being distributed through ATA and AIA, are not proposals. "No doubt much of our report is highly controversial, but we want to stimulate discussion now instead of waiting until the planes are ready for testing."

▶ **Problems, Not Solutions**—To make that point clear, he retitled his paper "Problems Relating to Airworthiness Requirements for Commercial Turbine-engine Airplanes," from the earlier "Civil Air Regulations for Turbine-Powered Aircraft."

Haldeman opened his talk with the point-blank observation that jet transports are the next logical step in air carrier development, then outlined some of the complexities to be faced with high speeds and altitudes.

These complexities are not new on folding, Haldeman said, because a survey of the information and data available points out a lack of operational experience for the basis of study.

▶ **Civil Test Program**—"Since safe operational procedures as well as airworthiness are an important part of all air regulations, the logical solution would be a civil operational test program in service test, possibly with a modified military jet airplane," he said.

"However, prior to such a program, we must study the overall subject and attempt to isolate the problems which will develop. With the present knowledge of the idiosyncrasies of turbine-driven aircraft, many of the problems can be brought to light, and a rational approach to their solution can be undertaken and solved, while other problems must wait for verification and operational test programs."

▶ **Possible Answers**—Haldeman then outlined some of the problems and indicated possible solution or choice of solutions. He had great praise on the need for beefing up structures especially around fuselage fuel tanks.

Though CAA will give consideration to including in regulations a requirement that all fuel be carried as remotely as possible from the fuselage, it recognizes that fuselage tanks may be necessary because of low thickness ratio of wing and high fuel consumption.

To overcome hazards, Haldeman listed these possibilities:

- **Protect tank** from damage or puncture in a crash landing by interposing substantial protective structure between tank and exterior of airplane.
- **Build tanks** capable of withstanding without failure any loads resulting from the accelerations occurring in a crash in which passengers could be expected to survive. The feasibility of a figure of at least 20-G should be investigated.
- **Isolate and ventilate tanks**

• **Give consideration** to restricting jet airplanes to the use of low volatility fuels.

▶ **Exit Factors**—Another problem is emergency exits, Haldeman declared. He and engineers should think about larger—perhaps fewer larger openings—that will permit speed in evacuation. He suggested a definite time limitation, possibly one second per person with a total time not to exceed one minute, "because the progress of fire is always rapid regardless of the size of the airplane."

Haldeman said recent experience has emphasized that positive securing of all doors and emergency exits is essential. To accomplish this it may be necessary to require that all exits open inward. Because inward opening doors could adversely affect ability to get out, the area at exits should be clear.

▶ **High Flight**—He also considered the oxygen problem encountered in high altitude flight.

"In the event of explosive decompression above 25,000 feet, all passengers and crew members must be immediately supplied with oxygen in view of the serious effects of anoxia at these high altitudes."

He listed three possibilities in coping with the problem:

• **Supply all passengers** with oxygen masks and instruct them in the use of equipment prior to entering altitudes above 25,000 feet. "This possibility," he acknowledged, "has the disadvantage of having a poor psychological effect on the passengers."

• **Flood the passenger compartment** with oxygen—perhaps impractical at extreme altitudes in view of the huge amount of oxygen necessary to accomplish this objective.

• **Make aircraft structures** sufficiently reliable so that additional supplementary oxygen breathing equipment would not be necessary.

The Civil Aeronautics Administration, he said, favors the last approach to the problem.

▶ **Smooth and Swift**—The CAA expert also discussed the aerodynamic cleanliness of future jet transports and pointed out such planes might exceed placarded speed limitations with inadvertent pickup unless they incorporate automatic speed control flaps. Any device incorporated should be able to operate fully within 5 seconds, he said.

Similarly, jet transports, with higher landing speeds, will require better brakes and braking systems, Haldeman declared. This is necessary because turbojet aircraft will not have the drag of propellers to assist in stopping. Turboprop aircraft, on the other hand, may be able to use reverse thrust.

Haldeman said that until a complete study of landing field length requirements is completed, the CAA suggests that the minimum landing speed in determination of the landing distance should be that used in ILS landings at the minimum glide angle of 3 degrees.

Airworthiness of aircraft engines is a big problem. Engine life must function reliably between overhaul periods. Initially the periods should be conservative, and lengthened only when justified by experience, Haldeman said.

▶ **Certificated Engines**—He said to date four turbine engines have been certificated for civil use. At least six more are being readied. But as provided for by Civil Air regulations, the turbine engines approved so far were approved on the basis of complying with existing military requirements.

He said the past five years have seen tremendous improvements and significant modifications to current turbine engines. He believes improvements in the future will be on a constantly decreasing spiral.

Haldeman said his report grew out of a symposium of the airframe, powerplant, and testing sections of his division.

He declared they had experience in all four commercial turboprop or turbojet planes now flying: the Vickers Viscount, the converted DC-3 with Double Mamba, the A. V. Roe Jetliner, and the de Havilland Comet.

▶ **Any Questions?**—In the question period that followed, C. L. "Kelly" Johnson of Lockheed good-naturedly asked if the proposals were designed with view to further penalizing American manufacturers—already behind on commercial applications of turbine and jet power. He referred to the higher safety factors, which, he thought at first blush, might be excessive.

Haldeman again emphasized the CAA wasn't yet making proposals for legislation, but wanted to stimulate discussion.

Johnson set the audience of several hundred engineers and scientists howling with his next question, "On the question of the best location for fuel tanks, would you tell me which part of a plane would be safest for a case of eggs, especially in a 20-G crash?"

Boeing Testing

New four-jet transport design models prepared for wind-tunnel trials.

Boeing engineers are studying two new versions of a 600-mph. jet transport to determine the final configuration of the company's successor to its piston-engine Stratocruiser.

AVIATION WEEK has learned that wind tunnel models of the two versions, both designed with similar 60-passenger cabin fuselages, are now ready for testing in the Boeing Seattle wind tunnel.

One version uses four single pods, evenly spaced below the wings. The other version uses two double-pod nacelles. Advantages seen for the four separate installations are the even distribution of engine weight along the wing and separation of the engines, to prevent a good powerplant from suffering damage if an adjoining engine in the same nacelle lets go a turbine blade.

▶ **Similar to Stratojet**—The four-pod set-up would be similar to the powerplant installation of the Boeing Stratojet B-47C which will use four Allison J-35-A-23 engines, each developing 9200 lb. thrust. (Designation of YB-56 which was assigned to the B-47C as noted in AVIATION WEEK April 24, has since been dropped, and the original designation for the four-jet bomber has been revived.) Engines of comparable power are indicated for the four-jet transport.

Except for variation in pod nacelles, the wings of the proposed Boeing transports will be similar, using the same 35-degree sweepback also used in the six-jet and four-jet B-47s. After five years of testing and design study, Boeing engineers have concluded that the 35-degree angle of sweepback is the most suitable for high subsonic speed wings.

They are also staunch advocates of the pod jet nacelle slung below the wing, as opposed to jet nacelles built integrally in the wings. Superior aerodynamic cleanliness, quick powerplant convertibility, greater safety, and other advantages are claimed.

▶ **Could Use External Tank**—On the basis of a survey made by Boeing, the 60-passenger design with a 3000-mi. range would be used primarily for one-stop transcontinental flights in this country. This indicates that 87 percent of U. S. airline passenger business is domestic. But the new design could be readily adapted for longer trans-Atlantic haul by addition of external fuel tanks, suspended under the wings, with a correspondingly decreased passenger load.

The new Boeing design uses a tricycle landing gear with double wheels of equal size at all three points. Rear wheels retract forward and inward into the belly of a figure-eight fuselage, something like that of the Stratocruiser. Passengers are seated on the upper deck, with the lower compartment used for cargo.

Dimensions of the proposed transport are within a few inches of the Stratocruiser's (141 ft. 3 in. span and 110 ft. 4 in. length). Projected gross weight of

135,000 lb. is also near that originally planned for the Stratocruiser. It is expected this weight would be increased for the trans-Atlantic jet version.

The 600-mph. figure quoted would be a top speed at 40,000 ft., with a cruising speed of around 560 mph. at the same altitude. It is estimated that the new transport would have a direct operating cost of 10.3 cents a ton-mile, as compared to 11.3 cents for the Stratocruiser. It could be ready for delivery to airlines 3½ years after it was ordered, Boeing representatives state.

Air Force Position Is Defended

Saville upholds stress on repelling atom attack; sees Korea air support adequate; Kindelberger backs jets.

Los Angeles—Our position in the Korean air was strongly defended and a revised Air Force attitude toward the design of military craft were outlined by speakers here last night.

Major General Gordon P. Saville, AF deputy chief of staff, speaking at the Institute of the Aeronautical Sciences annual dinner, upheld emphasis on long-range bombers and fast—but short-range—jet interceptors as necessary to guard against an atomic attack. But the Joint Chiefs have not gone all-out for strategic airpower to the exclusion of all else. Air supremacy has been the first mission of the Air Force, Saville claimed.

▶ **Air Support Adequate**—Asked why World War II aircraft were being pulled from moth balls to support combat troops in the Far East and why there are no modern support planes available, Saville replied that he didn't know of any inadequacies in air support comparable to other shortages such as tanks and infantry. He said he thought people expected too much of the Air Force if they wanted it to substitute for ground troops.

"Air support," he said, "is anything in the air from a B-36 down; and we have adequate air support in Korea."

World War II planes were put in storage just for such a contingency as Korea, he said.

"That left us free to spend our limited funds for research and long range bombers, and jet planes to beat off atomic attacks."

Saville acknowledged the Air Force's need for program stability—"a sound, long-range plan, consistently adhered to." He said the Air Force would stop trying to mastermind the manufacturers. Instead of giving them specifications, then finding out the plane built to those specifications is inadequate to the task, the Air Force will now describe the job to be performed, let the manufacturers take care of the specifications.

▶ **Jet Defense**—J. H. "Dutch" Kindelberger, chairman of the board, North American Aviation, Inc., spoke up for jet fighters at the Aviation Industry Dinner. We had air superiority over Korea in three weeks, he said, a job that took three years in World War II.

"Some criticism has been voiced because in certain tactical situations the jet fighters seem less effective than reciprocating engine fighters from World War II. It is quite true that many operations can be performed better by reciprocating engine aircraft, but it does not follow that our jet programs should be de-emphasized. We are building jet airplanes because we would need them if attacked by jet airplanes, and we know that Russia has many jet airplanes and is building more. It takes a jet to stop a jet. It's as simple as that," he declared.

"While we are extremely proud of the record the North American Mustang is making in Korea, we would be the first to admit that it could not hold its own against a jet fighter. The Mustang simply could not catch the jet. Therefore the jet could choose its own conditions for combat, or even do its assigned job and avoid combat.

"It is my belief that all fighter aircraft will eventually be equipped with jet engines. There may continue to be special cases of short duration where propeller type airplanes will have the upper hand. But in all-out warfare the jet is going to do the job."

▶ **Missiles Coming Up**—Kindelberger said he thought planes would give way to missiles before very long—"simply because we're reaching speeds too fast for pilots, too fast for the human eye."

But "in the present interim, when our forces in Korea are waiting for equipment and reinforcements, we are learning what it means to adopt a firm policy without having the stuff to back it up.

"It took us from May, 1940 to December, 1941 to reach all-out production in the last war, and it would take us until about the end of 1954 to do a corresponding airplane production job if war started today.

"This, of course, assumes that we will enjoy the same freedom from enemy damage to our plants and transportation.

"Looking at the picture from another slant, our production in the 1951 government fiscal year will be about 27 million airframe pounds. This is less than half the annual volume which the Congressional Aviation Policy Board said in its report two years ago we would need to avoid losing a war."

Agency Has Option On Flight System

The Civil Aeronautics Administration has currently contracted for one complete Eclipse-Pioneer automatic flight system with an option for up to twelve additional sets.

Both CAA and company authorities assured AVIATION WEEK that a total of 13 such sets was scheduled to be installed soon in CAA DC-3s. (AVIATION WEEK June 17). Award of the contract for the twelve additional automatic flight systems has not yet been announced.

Trans-Canada Air Lines is among the operators who have bought the Eclipse-Pioneer Flight Path Control unit, important part of the automatic system. The device, with throttle control, is installed on 20 of TCA's DC-4M2s.

Eclipse-Pioneer is a division of Bendix Aviation Corp., Teterboro, N. J.

'Bumper' Missile In Public Showing

The two-stage rocket 'Bumper' was flight-tested last week at a public showing inaugurating the first guided missile firing in the new Air Force long range proving ground at Banana River, Fla.

Aim of the demonstration was to check high supersonic speed phenomena at relatively low altitudes and the principle of step firing. Radar and optical tracking recorded the missile's trajectory.

Bumper's base component—the first stage—is a modified German-developed V-2. Smaller, second-stage missile, fired from the warhead compartment of the V-2, is the "WAC Corporal," first flown at White Sands, N. M., in 1947.

Firing of the step rocket was by General Electric personnel under supervision of the Army Ordnance department. GE is under Ordnance contract for development and testing of Bumper, and theoretical studies for V-2 and WAC Corporal modifications were made by California Institute of Technology scientists. Detailed engineering design and fabrication of the two-stage missile were made by Douglas Aircraft Co., Inc., at Santa Monica, Calif.

In February, 1949, a 250-mile altitude record was set with Bumper at the Ordnance Department's White Sands proving ground.

Purging Lessens Explosion Hazard

Air Force is planning installations on all military craft of system forcing fuel fumes out of planes.

Danger of explosion from fumes collecting around aircraft fuel tanks is being minimized by Air Force installation of an automatic fuel purging system which forces inert gas into fuel tanks as gasoline is consumed.

First installations will be on B-36, B-29, B-50, B-45 and B-47 craft, under a $13 million contract. Installations on C-54, C-47, and all other planes used as cargo and aerial troop transports will follow. The system will also be ordered for existing fast line combat aircraft and for all combat types now in production.

Fume escape from containers of high octane fuel in both fuselage and wings has long been considered a prime hazard, capable of being triggered not only by enemy guns but by internally caused static electricity.

► **XC-99 Damage**—A recent example of such a loss was experienced by the Convair XC-99, transport version of the B-36. It suffered considerable damage when fuel fumes were ignited in the outer port wing fuel cell while the plane was undergoing modification at Kelly AFB, Tex.

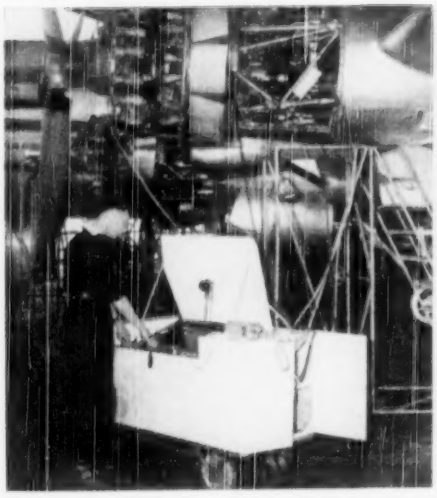
The problem of fuel purging has now become vital to Air Force as it tests practicability of mid-air refueling with B-29 aerial tankers. As a result, Air Materiel Command engineers have devised a method of sealing the entire internal wing area of an aircraft containing the fuel cells. The result is that an inert gas not only replaces fuel utilized by a plane's engines but completely occupies all areas where fumes would ordinarily collect. The forces fumes outward into free air and disperse. Inert gases under exploration by AMC have narrowed to nitrogen and CO_2, both non-combustible.

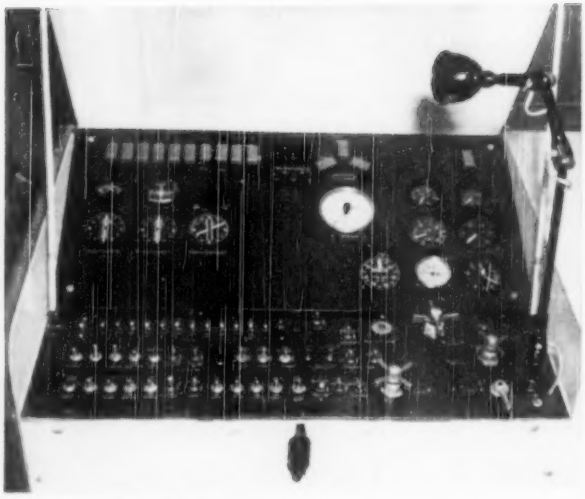
As funds permit, the fuel tank purging system will be expanded to cover all aircraft utilized by USAF. Concurrently the fuel purging system is to be combined to the fuel tank area and contact areas in the fuel exchange procedure susceptible to static sparks. The method of sealing off the entire area surrounding the fuel cell and tank area is still in an experimental stage at Wright Field, but is expected to be ordered for service test use this fall.

► **Industry Interested**—The commercial aircraft industry is particularly interested in the development of a complete fuel purging system, since installation in civil transports would increase the safety factor of airline operation.

The method being developed by AMC for initial use aboard combat aircraft excludes purging of the fuel tanks with CO_2 cylinders tapped and routed to the fuel tank vent system. The shut-off valve controlled by the pilot would render this system inoperative during on-the-ground maintenance, if necessary.

The system under development for eventual use by military aircraft incorporates an independent and automatic purging system which replaces the liquid fuel with an inert gas in a plane's tank as fuel is consumed and/or transferred by the aerial tanker. The inert gas in USAF's contemplated system also occupies the entire internal wing area surrounding fuel cells.





KLM 'WONDER WAGON'

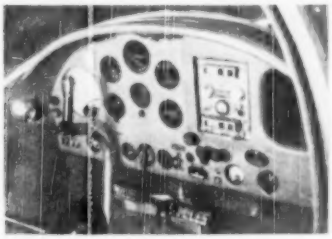
KLM credits their "Wonder Wagon" with substantial savings in time, man-hours, fuel and engine wear and tear. The tester is shown connected to an R-2800 (left).

Purpose is to check out all engine accessory systems before mounting engine on plane or, after mounting, while aircraft is in the hangar where other maintenance may be performed simultaneously.

The machine simulates action of an operating engine in the following systems: oil cooler door, cowl flaps, tachometer and propeller synchronization, primer solenoid, oil dilution valve, blower actuator, thermocouples, fuel pressure indication and warning, fuel flow, oil quantity, fire detectors, electrical propeller control, BMEP indication, vacuum and manifold pressure system.

The "Wonder Wagon" was created over a one year period by 17 KLM technicians, mostly in their spare time.

NEW AVIATION PRODUCTS



VHF Equipment

Among equipment shown at the International Aeronautical Exhibition, held recently at Brussels, Belgium, was a British-designed VHF transmitter-receiver intended for use in lightplanes. It is produced by Plessy Co., Ltd., Ilford, Essex.

Called Type PTR 61, this assembly provides radiotelephone facilities on any one of six crystal-controlled channels within the 118-132mc. band. For convenience, the face of the unit is designed to accommodate extra crystals in special slots (shown). Firm says crystals can be installed easily by the pilot to provide a wide choice of channel frequencies.

Once the appropriate channel has been selected, the pilot can set up the equipment by hand, tuning both the receiver and transmitter with a single control.

Remote control facilities are available, and the unit allows intercommunication up to three positions. It is shown here installed in the cockpit of a British Miles Gemini.

Cowling Latch

A unique toggle-type cowling latch which features high strength coupled with compactness and minimum weight is being tried up for production by Simmonds Aerocessories, Inc., Tarrytown, N. Y.

The latch was developed by King Aircraft Corp., Glasgow, Scotland, from whom Simmonds obtained production rights. Simmonds says it already has received wide acceptance in England. Among aircraft companies reportedly expressing interest in the new device are Boeing, Douglas, Bell and Sikorsky.

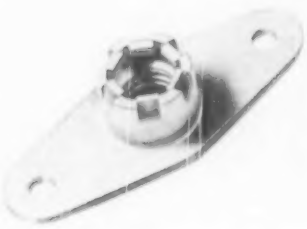
The latter two firms already are using latch experimentally, Simmonds says.

While it was specifically designed for use with engine cowlings, it is said to be highly suitable for such applications as cargo doors, access panels, armament compartments, propeller spinners and similar equipment where high strength fastening is needed. It can be used with either hinged or detachable panels.

The latch is designed to carry an ultimate load of about 7000 lb. in tension and 5000 lb. in shear. Weight ranges from 6 to 8 oz., in four sizes designed to accommodate all cowling screwbosses from 27 in. to diameter to flat.

The uncommon fitting gives the angle at the tension range is held within 0.012 in. from flush with surface. Total tension adjustment is 1 in. and cowling pull up 2 in.

The unit consists of two parts: a latch housing and a toggle assembly. Only four bolts are required for installation and there are no loose parts.



New Nutplate

Several advantages are claimed for a new self-locking nutplate recently placed on the market by Boots Aircraft Nut Corp., Stamford, Conn.

Called the "Plate Lok," this is the first nutplate designed on the Hex-Lok principle, according to Boots. Previously, this feature was restricted to hexagon-type nuts produced by the firm.

This one-piece, all-metal plate essentially is divided into a threaded locking section at the top, followed by a gap in the threads, then a conventional threaded section at the bottom for securing the bolt.

The top locking section is formed by depressing six threaded flanges inward and downward. These flanges exert positive pressure against the bolt of the bolt, but do not damage bolt threads, the company says. Flanges are held by tension and return to a depressed position when the bolt is removed.

► **Advantages**—Advantages claimed for this type of construction:

- **One-piece** all-metal construction.
- **High reusability factor.**
- **Resists** all types of vibration.
- **Makes it easier** to control design torque values in order to meet requirements of many special applications.

Boots supplies these nut plates in 4-40, 10-32 and 1/4 in. sizes. The part can be used up to 550 F.

Suspension Mounting

Latest design approach in engine mounting equipment by a leader in the field, Lord Mfg. Co., Erie, Pa., is embodied in the recently developed RC-27A Dynafocal Suspension.

The engine mounting system promises lower maintenance costs, a smaller toll for parts replacement, longer airframe life and, in general, greater safety. Recent Tests and recent service experience show the RC-27A system does a decidedly better job of isolating engine vibration than previous equipment, according to Lord.

The new engine mounts are "designed to provide increased service life . . . ground tests and operational experience show performance compromises which were inherent in previous engine mountings have been eliminated." Lord explains that this type of suspension "promotes safety throughout the airframe structure by reducing dynamic stresses from operation to fatigue."

The firm says Douglas Aircraft Co. has adopted the RC-27A system for use on its Super DC-3s.

Lighting Control

Westinghouse Electric Corp., Pittsburgh, now is producing a new saltype brightness control unit providing five different current outputs for control of high intensity series runway lighting systems. The unit is designed to meet requirements of CAA Spec. L-826.

With this mechanism, light intensity can be varied in five steps from 100 percent down to 25, 5, 1 and 0.2 percent of full brightness. This control is accomplished through use of an autotransformer with five tips and five oil switches. The switches are remotely controlled to select the tap and change the turn ratio of the autotransformer to provide the desired brightness setting.

The new assembly can be hooked up to the secondary of a 15, 20 or 25 kw., 6.6 amp. moving coil regulator.

PRODUCTION

USAF Awards

The following includes Aviation Week's listing of contracts awarded by the Air Force in April. Completion date is shown where available.

Remington Rand, Inc., Dayton, insulated wire cabinet, Apr., 1950, $13,546; [illegible] airborne Mar. 1950, $12,791; radar for subjects, June, 1950, $114,675; [illegible] subjects, Sept., 1949, $9,259.

Rensselaer Polytechnic Institute, Troy, N. Y., liquid phase screening, June, 1951, $7,500.

Republic Aviation Corp., Farmingdale, N. Y., spare parts for F-84 aircraft, June, 1950, [illegible] contracts, $14,915, [illegible] $31,[illegible]; spare parts for F-84 and F-47 aircraft, July, 1950, [illegible] contracts, [illegible] $[illegible], services of technical representatives, June, 1950, $[illegible]; spare parts for F-84E airplanes (ref. 1950, $[illegible]), [illegible] and services with regard to new [illegible] and [illegible] of [illegible] and [illegible] F-84 [illegible] aircraft, Apr., 1951, $[illegible].

Revere Corp. of America, Wallingford, Conn., electrical cable, [illegible] June, 1950, [illegible].

Reynolds Metals Co., [illegible], aluminum alloy, July, 1950, $[illegible].

Ripley Co., Middletown, Conn., [illegible] Service, July, 1950, $[illegible].

Rochester Mfg. Co., Dexter, N. Y., thermometers, July, 1950, $14,[illegible].

Romec Pump Co., Elyria, O., pressurized [illegible], $4,[illegible].

Rooters Bros., Inc., Brooklyn, [illegible] machine and maintenance, July, Aug., 1950, $13,[illegible].

Royal Typewriter Co., Dayton, typewriters, July, 1950, $11,[illegible].

Ryan Aeronautical Co., San Diego, Calif., [illegible] airplane, June, 1950, $[illegible]; spare parts for L-17A and B aircraft, June, 1950, $[illegible]; spare parts for L-17 aircraft, June, 1950, $[illegible].

Rychlik Engrg. Co., Chicago, pressure [illegible], June, 1950, $1,750.

Safety Equipment Co., Mount Hope, Ind., hydraulic tank, screening and [illegible], Aug., 1950, $15,[illegible].

St. Regis Sales Corp., New York, plywood [illegible] and tubing, July, 1950, $[illegible].

Schenuit, F. G., Rubber Co., Indianapolis, airplane [illegible], June, Aug., 1950, $[illegible].

Schultz Tool Mfg. Co., Mountainview, Calif., valve assembly, June, 1950, $[illegible].

Scintilla Magneto div., Bendix Aviation Corp., Sidney, N. Y., engine [illegible], Aug., 1950, $[illegible].

Seaboard Electric Co., New York, [illegible] spare parts, July, Mar., 1950, $[illegible].

Selector Industries, Inc., New York, [illegible], June, 1950, $[illegible].

Servomechanisms, Inc., Minneola, N. Y., [illegible], July, 1950, $[illegible]; [illegible] purchase of [illegible] A-1 and [illegible] 8B [illegible], Mar., 1950, $[illegible].

Shaw Estes, Dallas, [illegible] and [illegible], 1950, $[illegible].

Shaw Walker Co., Dayton, [illegible], Apr., 1950, $[illegible]; [illegible], Aug., 1950, $[illegible].

Sheffield Corp., Dayton, [illegible] for [illegible] and data, Sept., 1950, $[illegible]; [illegible], Sept., 1950, $[illegible].

Shoults, David R., Dallas, [illegible], June, 1950, $[illegible].

Sigmund Eisner Co., [illegible], N. Y., flying [illegible], Oct., 1950, $[illegible].

Sikorsky Aircraft div., United Aircraft Corp., Bridgeport, Conn., [illegible] parts for [illegible] helicopter, Aug., 1950, $[illegible]; [illegible] parts for H-5 aircraft, July, 1950, $[illegible]; [illegible] parts for H-5 and H-34 aircraft, July, 1950, $[illegible].

Simmonds Aerocessories, Inc., Syracuse, N. Y., propeller governor control units, Sept., 1950, $[illegible].

Smith, L. C., Corona Typewriter, Syracuse, Typewriters, May, 1950, $11,[illegible].

Solar Aircraft Co., San Diego, spare parts for F-86 aircraft, July, 1950, $[illegible].

Specialties, Inc., Syracuse, N. Y., spare parts for B-58 flight, Sept., 1950, $11,[illegible]; [illegible], Transportation, Aug., 1950, $[illegible].

Sperry Gyroscope Co. div., Sperry Corporation, New York, N. Y., qualification of air speed [illegible], July, 1951, $18,100; [illegible], Apr., 1951, $[illegible]; [illegible] and data, Dec., 1950, $[illegible].

Sponge Rubber Prod. Co., Shelton, Conn., [illegible], July, 1950, $[illegible].

Springfield Tent-Awning Co., Springfield, O., [illegible], Aug., 1950, $[illegible]; spare parts for C-2 [illegible], Sept., 1950, $[illegible].

Standard Electric Time Co., Springfield, Mass., [illegible], Aug., 1950, $18,[illegible].

Standard Precast Steel Co., [illegible], Dec., 1950, $[illegible].

Standard-Thomson Corp., Dayton, [illegible], Aug., 1950, $[illegible].

Star-Kimble Electric Co., Bloomfield, N. J., generating set, June, 1950, $[illegible].

Star Electric Motor Co., Bloomfield, N. J., [illegible], May, 1951, $[illegible].

Steel Drum Pkg. and Acc., Inc., Chicago, [illegible], July, 1950, $[illegible].

Stewart Truck Bodies, Hagerstown, Md., [illegible], Dec., 1950, $[illegible].

Stoff, Chas. C., Co., Washington, D. C., [illegible], June, 1950, $[illegible].

Stow Mfg. Co., Binghamton, N. Y., [illegible], Aug., 1950, $[illegible].

Stronghold Screw Products, [illegible], Sept., 1950, $[illegible].

Sun Electric Corp., Chicago, [illegible], June, 1950, $[illegible].

Sundstrand Machine Tool Co., Rockford, Ill., spare parts and [illegible] for [illegible] wheel drives, Dec., 1951, $[illegible].

Superior Piston Ring Co., Detroit, piston ring sets, Aug., 1950, $[illegible].

Swedlun Plastics Co., Los Angeles, spare parts for F-5 and F-51 aircraft, June, 1950, $[illegible].

Sweeney, B. K., Mfg. Co., Detroit, power [illegible], Sept., 1950, $[illegible].

Switlik Parachute Co., Trenton, N. J., [illegible] parachute assemblies, Dec., 1950, $[illegible]; parachute [illegible], July, 1950, $[illegible]; [illegible] personnel back type parachute, Dec., 1950, $[illegible].

Sylvania Electric Products, Salem, Mass., [illegible], Sept., 1950, $[illegible].

Technicraft Corp., Kansas City, Mo., aircraft [illegible], Oct., 1950, $[illegible].

Technitrol Engrg. Co., Philadelphia, test set, Oct., 1950, $[illegible].

Telleflsen, N., Sons, New York, spare for A-2 ground [illegible], June, 1950, $[illegible].

Telectro Industries Corp., L. I. City, N. Y., [illegible] and spare parts, Dec., 1951, $[illegible].

Tenser Electric Dexport, Co., Brooklyn, [illegible] and [illegible], Aug., 1950, $[illegible].

Texas Engrg. and Mfg. Co., Dallas, [illegible] and preparation for [illegible] of the [illegible] type aircraft, Mar., [illegible], fabrication and [illegible] of [illegible] and data, July, 1950, $[illegible]; [illegible], Dec., 1951, $[illegible].

Thermoseal Electric Mfg. Co. div., Mayflower, Compressor, Inc., Hillsdale, [illegible], Aug., 1950, $[illegible].

Timmerman Products, Inc., Cleveland, [illegible], Mar., 1950, $[illegible].

Toll-Benson Co., [illegible], July, 1950, $[illegible].

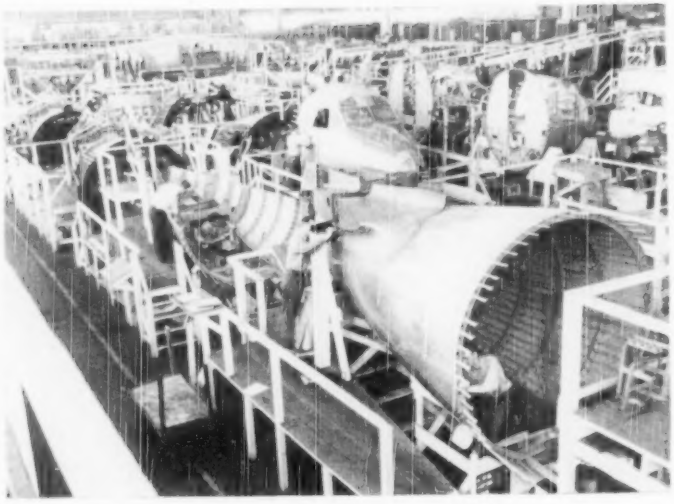
Traverlab, Inc., Dayton, [illegible], June, 1950, $[illegible].

Trailmobile Co., Cincinnati, spare parts for F-[illegible], F-5A and [illegible], Sept., 1950, $[illegible].

Transducer Corp., Boston, [illegible], Mar., 1951, $[illegible].

Tumpane Co., [illegible], [illegible] at [illegible], Nov. 1, [illegible], Aug., 1950, $[illegible].

Turco Products, Los Angeles, [illegible], Aug., 1950, $[illegible]; [illegible], Sept., 1950, $[illegible].



MARTIN 2-0-2A LINE IN ACTION

Production line of 2-0-2As moves along at Glenn L. Martin Co. plant. Twelve were ordered by TWA for lease pending delivery of its 4-0-4s (AVIATION WEEK July 17). Certification of these latest 2-0-2s will be at 41,600 lb. gross takeoff weight.

Underwood Corp., Springfield, O., typewriters, June, 1950, $6872.

U. S. Atomic Energy Comm., New York, 100-ton extrusion press, Apr., 1950, $6391.

U. S. Electrical Tool Co., Cincinnati, pedestal type grinder and data, Aug., 1950, $8877; portable electric drills, Sept., 1950, $5589.

U. S. Gauge Corp. div., American Machine and Metals, Inc., Sellersville, Pa., component, Dec., 1950, $24,790.

U. S. Lens Corp., New York, flying glasses, Dec., 1950, $86,120.

U. S. Rubber Co., New York, braided water hose, Dec., 1950, $8727; aircraft hose, Aug., 1950, $109,877.

U. S. Rubber Co., Detroit, airplane casings and tubes, July, 1950, $61,469; airplane casings, Apr., 1950, $2615; aircraft casings, July, 1951, $7808; casings and tubes, Jan., 1952, $27,742; airplane casings and tubes, May, 1950, $14,452.

U. S. Rubber Co., Mishawaka, Ind., spare parts for C-82 aircraft, June, 1950, $20,000.

U. S. Testing Co., Hoboken, N. J., nylon ribbon testing, Feb., 1950, $4584.

University of California, Berkeley, metallurgic research, May, 1951, $60,000.

University of Oklahoma, Norman, research program on jet propulsion fuels, Apr., 1951, $9813.

University of Texas, Austin, research services on development and evaluation, psychometric, June, 1950, $12,000; research study on exhibition of possible use of alkali holders in roentgenology and on intermetallic diffusion, Apr., 1952, $48,800.

University of Wisconsin, Madison, research studies covering temperature regulation in small wild animals, Apr., 1951, $6067.

Vacant Products, Inc., Tomah, Wis., engine enclosures, July, 1950, two contracts, $119,485, $13,971.

Variety Aircraft Corp., Dayton, skidat-container assembly combination survival kit, June, 1950, $3400.

Varo Mfg. Co., Garland, Tex., rework 400-cu. type E-1 static converters, Aug., 1950, $23,364.

Veeder-Root, Inc., Hartford, Conn., remaining film feed counter, Nov., 1950, $2514.

Vickers, Inc., Detroit, pump assembly, Sept., 1950, $41,414; maintenance data, June, 1950, $7016; maintenance data, July, 1950, $1175.

Victaulic Company of America, New York, gaskets, July, 1950, $2763.

Victor Adding Machine Co., Chicago, spare parts M-9 series bombsight, June, 1950, $5264; modification of S-M-9 series bombsights, Dec., 1950, $24,000.

Vought, Chance, Corp., Beverly Hills, type 0-19 recording cameras, Jan., 1951, $19,867.

Wagner Awning Mfg. Co., Cleveland, C-82 aircraft covers, July, 1950, $16,872; aircraft covers, Oct., 1950, $6818.

Wal-Co Products Co., Fargo, N. D., bag assembly, June, 1950, $11,246.

Weatherhead Co., Cleveland, fitting assembly hose, Aug., 1950, $4450.

Webster-Chicago Corp., Chicago, magnetic tape recording systems, Nov., 1950, two contracts, $119,583, $57,741; recorder playback mechanism magazine, Feb., 1951, $79,180.

Wells-Gardner and Co., Chicago, radio transmitter, Oct., 1950, $5614.

Western Electric Co., New York, supplies for radio equipment, Jan., 1951, $75,000; computers, computer test sets, control units, mounting and data, Mar., 1951, $315,916; transmission lines, Nov., 1950, $34,750; motion picture cameras, Aug., 1950, $14,012; instructional services, July, 1950, $4969.

Westinghouse Electric Corp., Dayton, lamps, Oct., 1950, $76,818.

Westinghouse Electric Corp., Bloomfield, N. J., photographic flash lamp, July, 1950, $6000.

Westinghouse Electric Supply Co., Dayton, plug connector, June, 1950, $3539; connector, June, 1950, $3227.

Whitehouse Products, Inc., Washington, D. C., photographic albums, Mar., 1950, $4348.

Wickland Mfg. Co., Pasadena, [illegible], July, 1950, $3904.

Wilding Picture Productions, Chicago, motion picture training film, Sept., 1950, $15,795.

Wisconsin Motor Corp., Milwaukee, [illegible] plant kits, Aug., 1950, $5000; spare parts for [illegible] air compressor, M-[illegible] and starters, F-[illegible], and fuel servicing trailers, Nov., 1950, $8000.

Wright Aeronautical Corp. div., Curtiss-Wright Corp., Wood-Ridge, N. J., [illegible], Mar., 1951, $2859.

Wyzenbeek and Staff, Inc., Chicago, [illegible] shaft grinder and maintenance data, May, 1950, $8968.

Yale and Towne Mfg. Co., Philadelphia, electric chain hoist and maintenance data, May, 1951, $19,108.

Yawman-Erbe Mfg. Co., Washington, D. C., desk trays, July, 1950, $4514.

York Corp., Cincinnati, machinery loading heaters in all-weather homes, May, 1950, $9000.

Watson Labs

Airborne Instruments Lab., New York, stable local oscillator with automatic frequency control, June, 1950, $18,621.

Engineering-Research Corp., Riverdale, Md., vector computer for automatic landing, Sept., 1950, $12,797.

Massachusetts Institute of Technology, Cambridge, services covering weather forecasting through statistical techniques, Feb., 1951, $50,000.

Northern-Zaleske Limited, [illegible], N. Y., chassis, June, 1950, $11,550.

Cambridge Labs

Applied Physics Corp., Pasadena, [illegible], June, 1950, $5000.

Bausch and Lomb Optical Co., Rochester, N. Y., optical gratings, Sept., 1951, $15,000.

Brujac Electronic Corp., New York, [illegible] generator amplifier, June, 1950, $3983.

Cannon, J. S., Co., Boston, research facilities, May, 1950, $1750.

Carnegie Institute of Technology, Pittsburgh, experimental studies of phase transitions, Mar., 1951, $18,000.

Federal Telecommunications Labs., Nutley, N. J., oscilloscope, June, 1950, $4917.

Gaertner Scientific Corp., Chicago, monochromator attachment (wavelength measuring), Aug., 1950, $2525.

Hendey Machine Co., Torrington, Conn., geared head engine lathe, May, 1950, $11,516.

Hewlett-Packard Co., Palo Alto, Calif., voltmeter, May, 1950, $3000.

Isaacs, H. D., New York, research test, Mar., 1950, $4648; research tests, May, 1950, $17,548.

Lab for Electronics, Inc., Boston, [illegible] amplifier and unit, Apr., 1950, $3000; components of [illegible] equipment for [illegible] project, June, 1950, $21,300.

New York University, New York, services of settings in connection with study of large scale oscillations of atmosphere, Apr., 1952, $41,000.

Polytechnic Research and Development Co., Brooklyn, [illegible] and type 201, June, 1950, $1520.

Raytheon Mfg. Co., Waltham, Mass., [illegible], Aug., 1950, $20,735.

Televiso Products Co., Chicago, multipurpose [illegible] [illegible] components, May, 1950, $6775.

University of Denver, Denver, continuation of services in connection with research [illegible] of the upper atmosphere, Mar., 1951, $43,500.

AF Invitations to Bid

Bids openings are 20-30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who write local field office, stating bid invitation number.

One bid set will be available for examination without obligation by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bid sets.

Procurement field office locations: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Lange Aves., Detroit 32; 155 W. Washington Blvd., Los Angeles; 67 Broad St., N. Y. 4.

INVITATIONS

Bolt, aircraft, [illegible] items, bid invitation No. [illegible], issue date 18 July, delivery schedule shall be set forth in the call letters when issued.

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Bolt, aircraft, [illegible] items, bid invitation No. [illegible], issue date 7 July, delivery schedule shall be set forth in the call letters when issued.

PRODUCTION BRIEFING

▶ **Boeing Airplane Co.**, Wichita, is setting up a B-47 Stratojet static test rig comprising seven steel towers, one weighing 25 tons. Three others weigh about 15,000 lb. each and the rest are smaller.

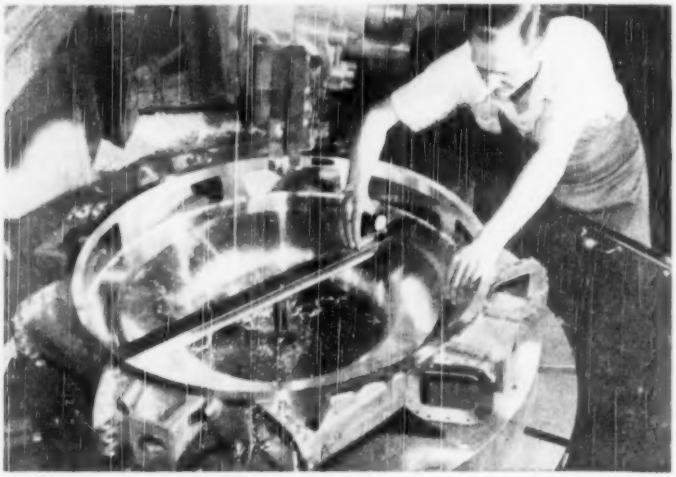
▶ **Brown Instrument division** of Minneapolis-Honeywell Regulator Co. will open its second half of 1950 maintenance and repair courses for customer employes Aug. 14 at Philadelphia. Classes will be held on a three-, five- and 15-week basis.

▶ **Fairchild Engine division** is new name for former Ranger Engines division of the Fairchild Engine & Airplane Corp., L. I., N. Y. The division is now engaged in development of various types of jet engines, being completely converted from reciprocating powerplants.

▶ **Hiller Helicopters**, Palo Alto, Calif., has a working production order backlog of over $400,000 in civilian and military orders. Orders are now being accepted on a 90-day delivery basis, except for emergency operations.

▶ **McCulloch Motors Corp.**, Los Angeles, has completed new research facilities occupying 7500 sq. ft. of floor space. The new building contains seven engine test cells.

LIGHT WEIGHT Cast magnesium accessory case weighs but 30 lb. and is easily lifted with one hand.



MIRROR SMOOTHNESS Compressor case receives highly machined surface accurate within 50/100,000 in. High velocity air from compressor is guided by this surface to the combustion chambers without inducing turbulence that would cut down engine efficiency, so close gaging is needed.

Along P&W's Jet Production Line

Powerfully punctuating a quarter of a century of engine building, Pratt & Whitney's turbojet activity is upholding the reputation founded on piston powerplants.

Its J48 Turbo-Wasp, claimed to be the most powerful jet plant now flying for the Air Force and the Navy, powers these fighter prototypes: Lockheed F-97, North American F-93A, and Grumman F9F-5. Basic rating is 6250 lb. static thrust, boosted with afterburner and water injection.

Forerunner of the J48 is P&W's J42, used in an early model of the Grumman F9F-2.

Each engine requires more than 12,000 production tools. In addition to its experience-proven metal working techniques for piston engines, P&W has developed special fabricating methods for its jet plants.

These photographs, taken along P&W's production line, show some of the highlights of the jet fabricating scheme.

BUFFING High velocity outflow in the double-sided compressor also requires smooth finish. Each blade receives high polish with hand-held buffer.

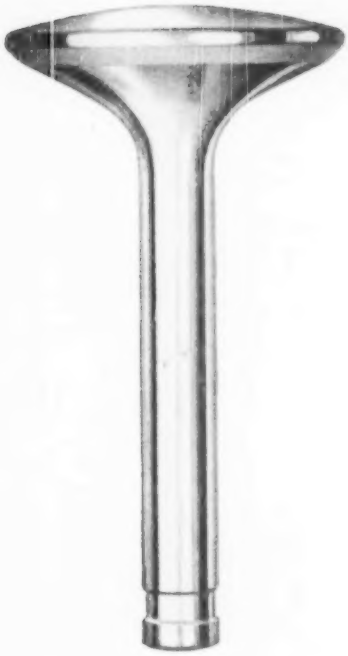
WELDING AID Special jig allows precise weld work. Tack welding is done on combustion chamber liner with no danger of position change.

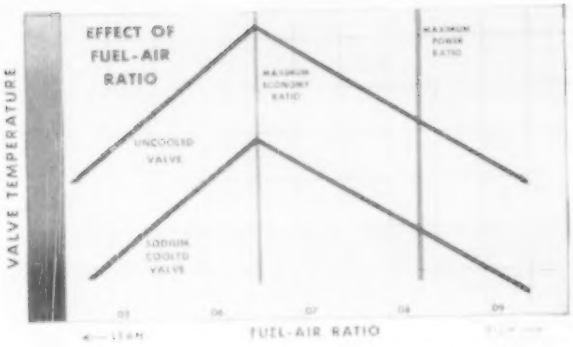
METAL SPRAY Low carbon steel chamber receives atomized aluminum protective coating. Wire is fed through torch for melting.

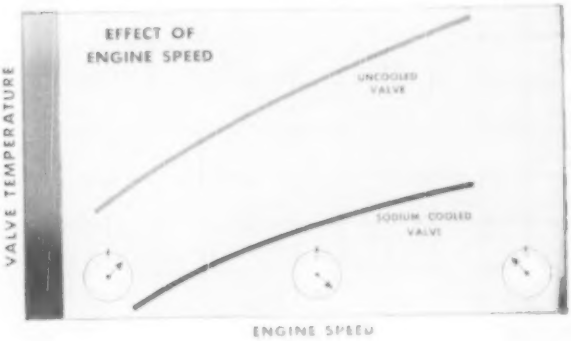
Why Sodium Cooled Valves?

The trend of modern engines is to operate at higher speed and more economical fuel-air ratio. In considering factors which influence exhaust valve life, temperature is the dominant one. High temperatures sharply reduce the resistance to corrosion, distortion, and fatigue life of the finest alloy steel. The effectiveness of sodium cooling in reducing valve temperatures is shown by the curves below, which are typical of recorded test data.

The curve "Effect of Fuel-Air Ratio" shows that as the mixture is leaned out to obtain maximum economy, valve temperatures rise. The curve showing "Effect of Engine Speed" indicates that temperature rises quite rapidly as speed increases.







EATON
MANUFACTURING COMPANY
General Offices CLEVELAND, OHIO

Eaton engineers will welcome an opportunity to discuss the application of Eaton sodium cooled valves to engines proposed or now in design.

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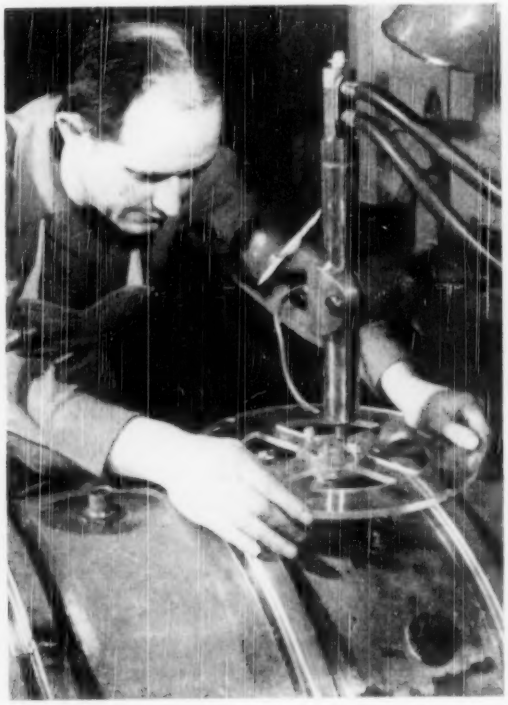
Along P&W's Jet Production Line . . .

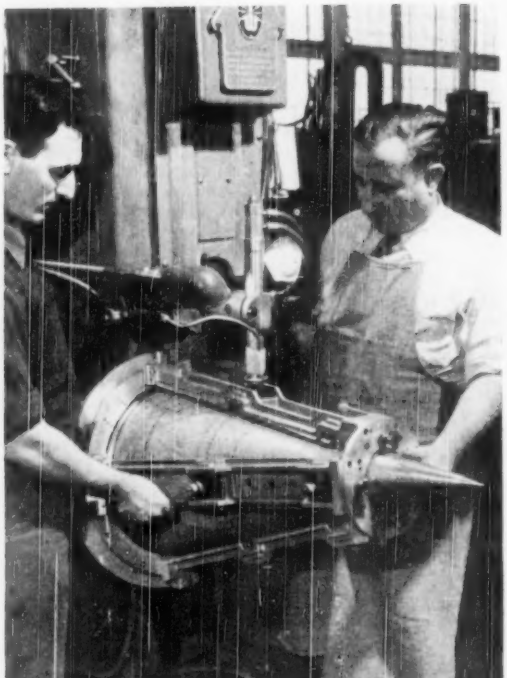
BROACHING The turbine wheel is readied for buckets. Setup of broaches cuts 54 precise pinetree slots in the solid turbine rotor.

BUCKETS Before attachment to the rotor disk, each bucket gets careful polishing to give finish that will stand up under high turbine heat.

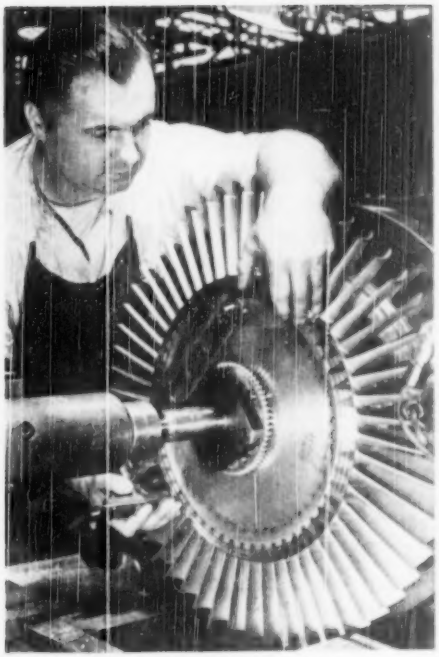
FITTING Assembled on rotor disk, buckets are fitted with a tip movement of .78/1000 in. to allow for expansion and contraction in service.



INDEXING FIXTURE In this spotwelding procedure a circular plate jig is adapted to facilitate location of welding electrode.



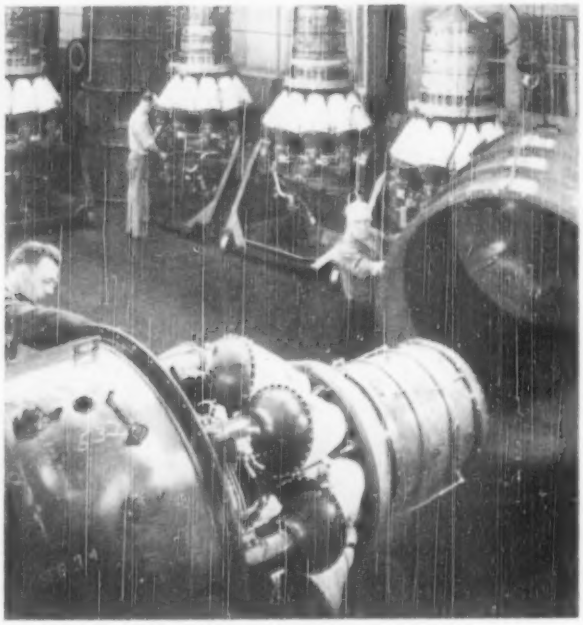
TAILCONE JOB Sturdy holding fixture serves as rigid support for work on Turbo Wasp's sheet metal tailcone as many spotwelds are applied.



SEAL CHECKED In this turbine rotor operation a special gage is employed for checking the diameter of the labyrinth seal grooves on disk. Close tolerances insure seal efficiency.

TAILPIPE WELD Here a craftsman puts seam weld on the outer stainless steel casing of the tailpipe. The welding machine is checked carefully for accuracy before production operation begins. Tube sprays cooling water over weld contact spot.

GREEN ASSEMBLY Compressor unit forms base on which engine assembly is built up. Covers are used to exclude dirt.



END OF LINE After initial test run, inspection and final run, the turbojet is ready for shipment. It is rubber cushioned and sealed in steel drum to insure maximum protection for parts.

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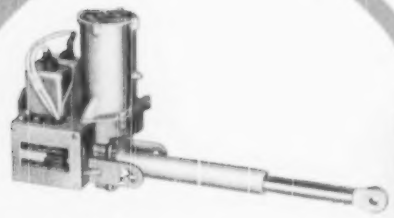
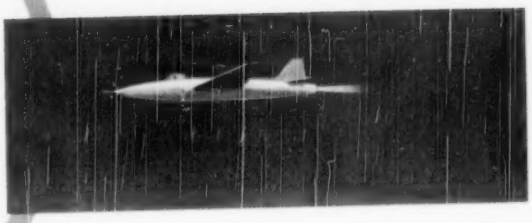
you accentuate the Actuator...



Model No. 9504

SPECIFICATIONS: 400 cycle AC
Positive non-jamming stops
Adjustable load limit switches

Other models available for 24 volt DC



This linear actuator that performs efficiently in temperatures of over 100 degrees *below* zero is one of the many new products recently perfected by Hydro-Aire. Approaching the other extreme are products tested for temperatures of 700 degrees *above* zero. Two good reasons why you should acquaint yourself with Hydro-Aire facilities and man-power.

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Top sketch shows Martin's flaps extended. Silhouette reveals craft's long afterbody.

New Water Flaps For P5M-1 Marlin

Slow maneuverability on water and inability to stop quickly while taxiing is expected to be licked substantially on the Martin P5M-1 Marlin flying boat by use of a pair of underwater flaps hinged to the lower part of the hull near the tail.

This is being incorporated in the experimental P5M-1 and all production models of the plane.

Need for an installation to give increased maneuverability and braking became apparent during tests of the P5M-1.

To overcome a troublesome problem in older flying boats with high step and long tunnel leading to the tail, the P5M-1 has a long afterbody for greater water stability during taxiing, takeoff runs and after landing. But this additional amount of hull underwater greatly increased the "stiffness" of the plane in maneuvering to a buoy or getting through a breakwater opening into a basin.

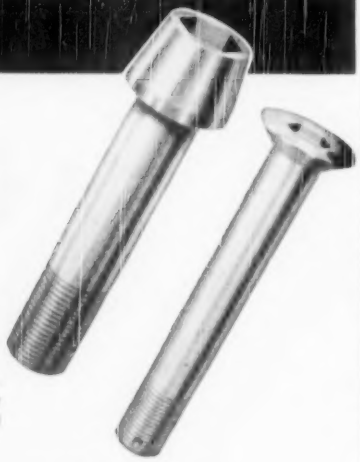
So Martin engineers conducted an extensive experimental study in which even outboard motors and keel nose rudders were tried. The flap installation was chosen after successful model tests in the towing tank at Stevens Institute of Technology, Hoboken, N. J.

The flaps will permit operation in more restricted areas than was previously possible, the towing tank tests indicating that reduction in turn radius over old type boats will be at least 50 percent.

And anchoring the craft to a floating buoy will be simplified. With the new

SPS AIRCRAFT FASTENERS

UNBRAKO



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. . . are made to latest NAS Specifications. Threads are fully formed by rolling after heat treatment, an important UNBRAKO feature. Full range of standard sizes.

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. . . incorporate the famous FLEXLOC self-locking principle and one-piece, all-metal construction. The exceptional reliability of this construction has been proved by the millions of FLEXLOCS used in the aircraft industry.

Other outstanding advantages include:

Maximum tensile with minimum weight

Approved under latest NAS Specifications

Large bearing surface

Positive self-locking—"won't shake loose"

Temperature range to +550° F.

No special tools needed—use standard 12-point socket or box wrenches. Designed for use in cramped quarters

Sizes from ¼" to ¾" NF Thread Series

Send for samples and information.

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The one-piece FLEXLOC is both a stop and a lock nut, due to its resilient segments which lock *positively*, even under extreme vibration. Torque is unusually uniform—within a few inch pounds. "Thin" and "regular" types; NC and NF threads. Officially approved by many U. S. depts., bureaus, etc., and CAA for aircraft use.

Write for further information on these UNBRAKO *and* FLEXLOC *Products.*

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devices, the initial anchoring procedure will be controlled by the pilot until buoy contact is made, in contrast with past practice involving, in addition to use of reversible pitch props, sea anchors thrown out from either side of the plane and controlled by crewmen to pay out or pull in the line, as necessary.

Pilot-operated, the flaps may be used paired or individually. Hydraulic power for the units is solenoid-controlled.

Hinging is angular, so that when flaps are opened they are almost vertical. They may be extended to the full 65 deg., but if pressure becomes too great, an automatic spill-over gives retraction to an angle where the pressure can be tolerated.

Jetliner Tests Pushed by Avro

A. V. Roe Canada Ltd.'s Jetliner is piling up flight test time. It already has passed the 100-hour mark aloft.

Latest information is that the craft has climbed to 39,500 ft.—9500 ft. higher than its normal cruising altitude.

It has bettered 500 mph. in level runs and its stiff wing permits riding through normal turbulence at higher speeds than conventional transports with "no uncomfortable wallowing and much less jolting."

One flight of more than 1100 miles has been made. And a number of flights over an 800-mile triangular course between Toronto, North Bay and Montreal gave an average flight time of about two hours. Fuel consumption for this pattern was 1920 gal. (U. S.).

▶ **One-Engine Flight**—The plane has been flown level on one engine at about 200 mph. on a number of occasions. Smooth operation of the craft, says Avro, has resulted in "remarkably little trouble" with instruments, accessories and other equipment.

Landing trials disclose that final approach speed is 125-130 mph., dropping to 115-120 mph. at field edge, actual touchdown being at 95-100 mph.

Avro says that sharp deceleration encountered with piston-powered craft when throttles are closed is not experienced with Jetliner. But there is enough drag in the fully lowered flaps so that throttles need not be closed very early.

Acceleration is rapid, giving a very steep climb for obstacle clearance.

Avro technicians have always insisted that there are no special runway or ramp problems caused by the jet. They have encountered no trouble with concrete or asphalt surfacing during run-up for takeoff. They report that there is no discomfort to ramp observers as the craft moves away.

Fitting the Jetliner into the conventional-plane traffic at the Toronto (Malton) airport has given no difficulty.

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in all kinds of weather . . . Marquette Aircraft Wipers
are contributing a *safety factor* to
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More than ten years of specialized
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Martin 4-0-4

pressurized, high-speed AIRLINER

Designed from nose to tail by modern Martin Systems Engineering . . .

Whether the Martin product is a commercial airliner like the 4-0-4, a military bomber or a guided missile . . . Martin's engineering staff works on *all* phases of the design problem . . . airframe and power plant, electronic flight and navigational controls and military armament or passenger facilities. And development work is so scheduled that the end product represents a completely coordinated system.

That is Martin *Systems Engineering.* That is why the Martin engineering staff is designing aircraft and missiles as integrated airborne systems, not merely as flying vehicles whose sole goal is speed.

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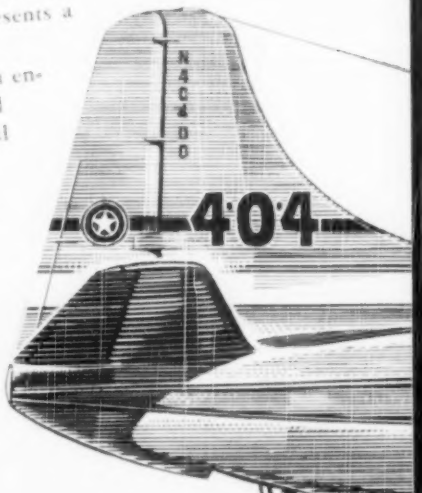

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For OPERATING ECONOMY! High revenue capacity, high cruising speed and low maintenance costs add up to maximum economy for Martin 4-0-4's. Fast ground loading features will cut stopover time. And remember, the 4-0-4's basic configuration, originally designed for low-cost maintenance, has been further improved as a result of almost three years of Martin 2-0-2 experience with Northwest Airlines and leading South American lines.

For PASSENGER APPEAL! Shorter trips, shorter stops, and pressurized, air-conditioned, comfortably quiet cabins will give travellers more reasons to fly by 4-0-4. And the Martin 4-0-4 Airliner can serve smaller airports to help expand air travel business.

For DEPENDABILITY! Excellent low-speed flying qualities as well as higher cruising speeds will result from the 4-0-4's efficient wing and flap design. Built-in aerodynamic stability will permit wide range of passenger and cargo loading.

For FUTURE USEFULNESS! Present structural and performance margins permit gross weight, payload and power plant changes to meet future airline requirements. Turbo-prop engines will result in higher cruising speeds, a longer useful life.

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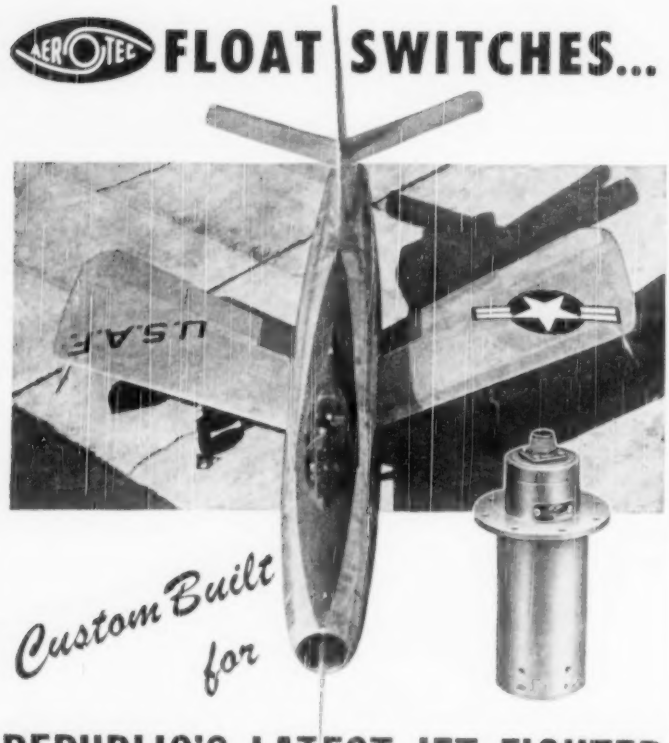

REPUBLIC'S LATEST JET FIGHTER

Republic's XF91 Interceptor utilizes 20 Aerotec Float Switches to assure dependable indication and control of propulsive fuels.

Aerotec's proved record of efficient automatic controls on the thousands of F47's and F84's that have been and are in service earned its consideration when the XF91 was in the development stage.

The XF91 is one of the many Navy and Air Force fighters that advantageously employ Aerotec's policy of designing a specific control for each individual problem.

Whether the application calls for float switches, valves, diaphragm or bellows pressure switches, Aerotec's representatives throughout the country, specially picked for their knowledge of the aircraft industry, are ready to offer assistance on any automatic aircraft control problem you may have.

Address all inquiries to The Thermix Corporation.

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Standardization For Blade Dimensioning

Aircraft turbine blades may finally be dimensioned by a single standard method, if the aeronautical drafting manual committee of the SAE has its way.

Representatives of aircraft turbine manufacturers are serving on an SAE subcommittee to develop a uniform method of dimensioning turbine blading.

The purpose: to reduce the cost and time required to inspect the blades.

The turbine blade has no natural reference from which to dimension. Some manufacturers use a developed chord line as their datum; others use blade leading or trailing edge; still others use space coordinates. Such a diversity of dimensioning means that the supplier of the blades must invest in gages and tooling for the entire range of standards, and this is expensive.

Time savings should also be realized with a single standard of dimensioning.

The committee plans to consult with designers and inspectors in developing its recommended dimensioning system, according to John Dzeal of Ranger Engine Division of Fairchild.

Serving with Dzeal are members of Pratt and Whitney, Westinghouse, General Electric, Allison, Wright.

Bumps Recorded In Rough Air Tests

"Bumps" have taken on added significance in aviation circles lately because of a rough air study being made by the National Advisory Committee for Aeronautics at the Brookhaven National Laboratory.

NACA is sponsoring the project, with the help of Air Force personnel and equipment from Mitchel Field, Long Island, and the 420-ft. tower on the grounds of the Brookhaven National Laboratory.

In the program, an AF lightplane flies in the vicinity of the tower and records its motion in the air by sensitive instrumentation. Impulses from the plane's radio are transmitted and recorded photographically at five-second intervals to provide a common time coordinate between the plane and the tower instrumentation.

NACA believes the study to be the first attempt in the correlation of tower measurements of air turbulence with aircraft measurements made in flight. Reduction and comparison of the data can lead to improved methods of describing air turbulence mathematically, which in turn will aid aircraft designers by providing better gust load information.

New Testing Devices For Aviation Cadets

Reaction time of aviation cadets is determined by a specialized testing device which was shown recently at the Chicago convention of the Aero Medical Association.

Machine consists of two units, one housing four groups of lights, and the other housing four groups of control knobs.

In use, a problem is set up by positioning the lights; each problem can be solved by operation of the proper control knob.

▶ **Coordinator**—Another testing aid demonstrated at the convention was an epicyclic rotary pursuit tester. The subject attempts to keep a stylus in contact with a target which rotates within a rotating turntable.

The target is small—approximately the size of a dime—and the task of keeping continual contact provides a key to the mental and physical coordination abilities of the student.

▶ **Training Aid**—These devices were said to be in the experimental stage. Both were developed at the USAF School of Aviation Medicine, Randolph AFB, Texas.

Scientists at the base correlate the flying proficiency of pilots with the test scores those same pilots made as aviation cadets. This provides data for an evaluation of test procedures as an efficient means for determining pilot capabilities.

New Stud Standards

Approval of 92 Air Force-Navy-Industry aircraft engine stud interchangeability standards offers promise of substantial savings in fabrication time and costs.

Developed by the Society of Automotive Engineers' Aircraft Engine and Propeller Standard Parts Utility Committee, E-25, 29 West 39th St., New York 18, N. Y., the new grouping covers all average studding requirements pertaining to engine and prop fabrication.

Included are straight, stepped and necked studs, and various combinations such as stepped-drilled and step-necked types.

Stock problems will be simplified for military procurement, one stud type substituting for about 16 previously required. Savings are expected in these details: Paper work, requirements determinations, storage space for rough and finished parts, money investment, and inspection time. Shortages, usually a vital factor, should also be minimized substantially.

ENGINEERS NOTEBOOK

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MARMAN CHANNEL-BAND COUPLINGS PROVIDE AN EFFECTIVE JOINT AND SEAL FOR ELBOW IN AIR DUCT. WILL ACCOMMODATE PRESSURES TO 400 P.S.I. DEPENDING ON DIAMETER AND TEMPERATURES FROM −100°F TO 500°F BY USE OF DIFFERENT SLEEVE LINERS

FOR EASY ASSEMBLY OF LOW PRESSURE AIR DUCTING

MARMAN UNIVERSAL (QUICK-DETACHING) CLAMPS SAVE TIME AND COST IN ALL SUCH APPLICATIONS. PHOTO SHOWS DUCT PRIOR TO CONNECTION OF MALE END. FABRIC COVERING PROVIDES SEAL WHEN CLAMP IS TIGHTENED

ATTACHMENT OF FLANGED HOT AIR EXHAUST

MARMAN VENTILATED COUPLING MAKES AN IDEAL ATTACHMENT FOR METAL BELLOWS BETWEEN HOT AIR DUCT AND HEATER. FLEXIBILITY OF THIS COUPLING PROVIDES EASY INSTALLATION IN RESTRICTED AREA

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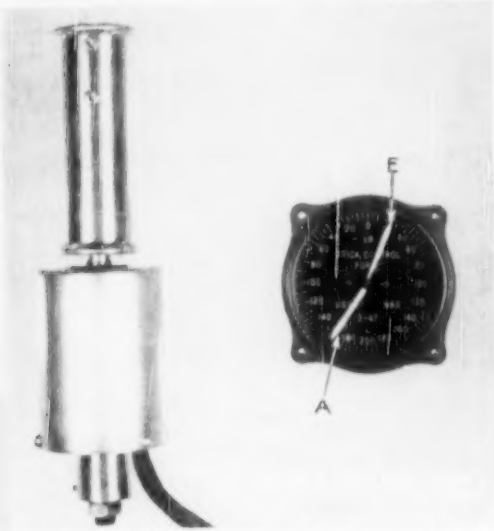
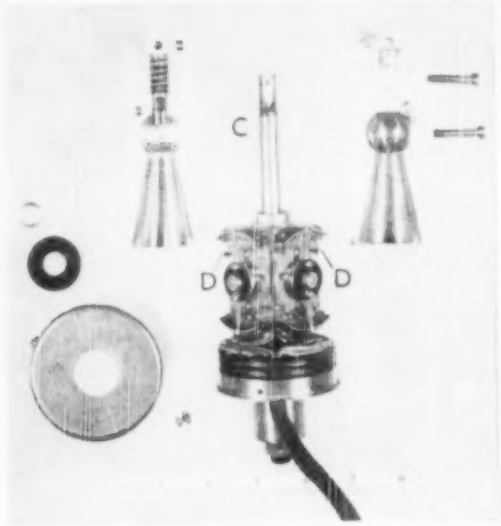


CONTROL STICK FORCE at any instant is measured by this NBS-developed device. Handle (left) replaces standard stick handle and dial pointers show force to operate ailerons (A) and elevators (E). Disassembled view (right) reveals cantilever spring rod (C) acting in two directions to produce brush (D) rotation in two d.c. Selsyn transmitters. Brush voltages deflect pointers.



Stick-Force Indicator Simplifies Testing

Spring deflections control voltages that operate d.c. Selsyn type indicator. Varying voltage no trouble.

One of the prime problems in flight testing aircraft—easy measurement of stick forces—should be facilitated materially by a new automatic indicator using the flexure of a cantilever spring incorporated in the stick handle. The device was developed for the Navy by F. Cordero and S. H. J. Wiomack of the National Bureau of Standards' mechanical instruments laboratory.

Advantages of this new stick-force indicator:

- Compactness.
- Easily installed.
- Unaffected by ordinary fluctuations of aircraft battery voltages.
- Adequately sensitive.
- Permits photographic record of forces.
- Requires but little pilot attention.

Important consideration in flight testing new types of aircraft is relation between force applied by pilot to the controls and their actual deflection in various maneuvers and at different air speeds. Pilot force must not be so great as to prevent safe handling during any flight condition.

In many airplanes the principal control is a tube extending vertically in front of the pilot and terminating in a simple grip, or handle. Sideways movement of this "stick," deflects the lateral or aileron control surfaces, whereas forward or backward movement governs the longitudinal or elevator controls of the craft.

▶ **Usual Procedure**—The two components of the force exerted on the stick were generally measured by:

- Pressing a single-component grip-type spring scale successively in the two required directions, or
- Attaching strain gages to some part of the system used to transmit the control force.

Both of these methods had their disadvantages. The first was inconvenient and distracting to the pilot, did not give simultaneous measurements of the two force components, and did not permit a permanent record to be made. Strain gages are still used and useful, but their readings are sensitive to voltage variations, and an amplifier is required with more than one indicator.

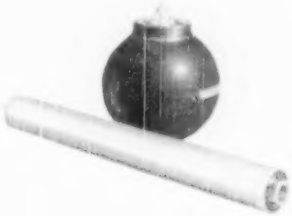
▶ **New Setup**—In contrast, the instrument developed by the Bureau operates satisfactorily on varying aircraft voltages and makes possible a complete photographic record of the forces in the two required directions without disturbing the pilot in the normal operation of the controls.

In this device the standard stick handle is temporarily replaced by another containing the sensitive element, a cantilever spring whose deflection is measured in the two perpendicular directions. These deflections control electric voltages that operate a dual-pointer indicator of the d.c. Selsyn type.

The cantilever spring is in the form of a vertical rod of circular cross-section, the lower end being held firmly as a post in the base of the unit. At the top of the rod a sphere is attached, and about the sphere is clamped the cylindrical handle, thus effectively localizing the application of force by the pilot at essentially one point.

Flexure of the rod is then a measure of the transverse force exerted through the handle and spherical joint.

▶ **Operation**—When the rod is bent by the application of a force at the handle, it deflects one or both of two flat spring strips mounted vertically beside the rod, attached at the lower end but free at the upper end to swing out with the rod as it bends. The flat strips are mounted in vertical planes that are



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AN types cylindrical and spherical shapes—
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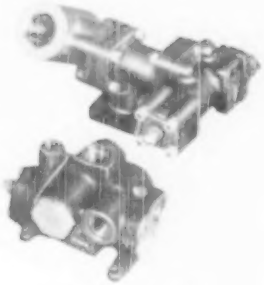

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dependable—quiet

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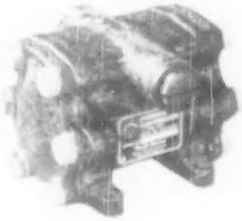

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Dividing and proportioning types—
dual acting units.

PRESSURE REDUCING VALVES
One way, types — Reducers incorporating
relief valves—pressure compensated types.

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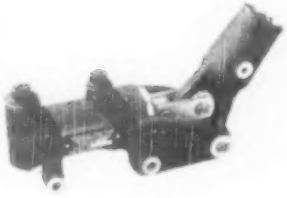
For both 1500 and 3000 PSI hydraulic systems Bendix-Pacific offers you dependable products backed by an established company with a nationwide service department. The products shown on this page are typical of the more than 70 proprietary items available. In addition to these products Bendix-Pacific offers its full facilities to design products to meet your specialized requirements or to manufacture to your own specifications.



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Here's Adel's new line of lightweight 3000 psi, non-interflow 4-Way Disc Type Selector Valves with extremely low handle torque, negligible pressure drop and excellent leakage characteristics. More than meeting the latest proposed AN Specification requirements, they represent the most advanced engineering design for 3000 psi manually-operated Selector Valves. Non-interflow design completely eliminates all undesirable interflow when changing shaft positions. No moving packings under system pressure. Hydraulic sealing is accomplished by hardened surfaces that are optically flat within one eleven-millionth of an inch. Available with or without detents in 1/4", 3/8", 1/2" and 3/4" line sizes with a wide variety of flow patterns.
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#20907 1/4" AND 3/8"

LINE SIZE

TOTAL PRESSURE DROP
15 psi at 2 gpm flow,
37 psi at 3½ gpm flow
HANDLE LOAD
17 inch-lbs. at 1500 psi
20 inch-lbs. at 3000 psi
1 Drop per min. internal leakage max. at 3000 psi

#20908 1/2"

LINE SIZE

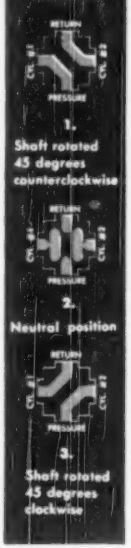
TOTAL PRESSURE DROP
45 psi at 6 gpm
HANDLE LOAD
[illegible] inch-lbs. at 1500 psi
50 inch-lbs. at 3000 psi
1 Drop per min. internal leakage max. at 3000 psi

#20909 3/4"

LINE SIZE

TOTAL PRESSURE DROP
65 psi at 15 gpm
HANDLE LOAD
50 inch-lbs. at 1500 psi
60 inch-lbs. at 3000 psi
1 Drop per min. internal leakage max. at 3000 psi

TYPICAL FLOW PATTERNS



ADEL

*Patent Pending

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at right angles, so that one strip is deflected by motion of the rod at right angles to that which deflects the other.

Outward or inward motion of either of the strips moves a lever attached to the brush shaft of the corresponding Selsyn transmitter, causing rotary motion of the brushes of the transmitter.

The voltages thus produced are transmitted to two commercial d.c. Selsyn indicators, which show motion in the two perpendicular directions. Both indicators are housed in one case having a single 360-deg. scale graduated directly in pounds of force. A second dual indicator may be connected in parallel with the first for duplication.

Since the deflection of the spring rod is proportional to the force applied to the handle, and since the rotation of the brushes is nearly linear with respect to the rod deflection, a force indicator with essentially linear scale results.

▶ **Handle Details**—When no force is being exerted on the handle, it is kept coaxial with the vertical rod by a coiled spring and plunger placed in a cylindrical cavity within the handle just above the sphere to which the handle is clamped. The handle is only bearing-tight about the sphere, which is screwed to the top of the rod.

When the handle is displaced, the compressed spring presses the plunger down against a flattened part of the sphere and acts to return the handle to the neutral position.

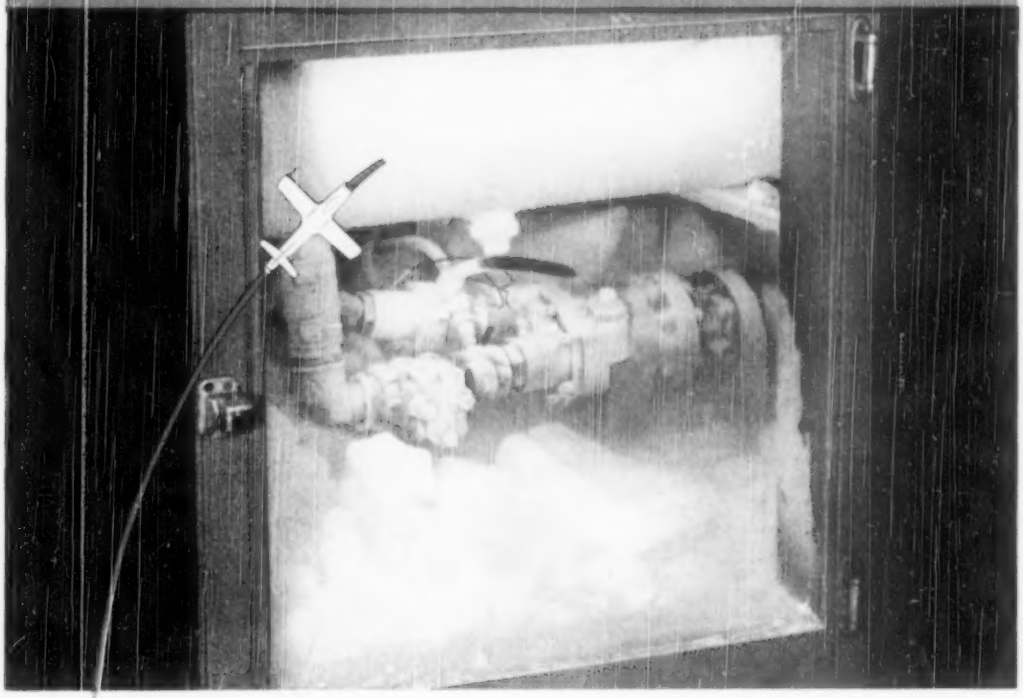
▶ **Force Measured**—The instrument is designed to measure a maximum force of 200 lb. in each of the two perpendicular systems separately, or a maximum of approximately 140 lb. in both systems simultaneously. A d.c. voltage between 22 and 28 is required, with a current of 50ma. at 28v.

An eight-wire cable connects the transmitter and indicator units. The circuit includes two 100-ohm protective resistors and four 7600-ohm rheostat segments obtained from ordinary potentiometers, as well as four pairs of silver brushes and four contact bars of silver wire. Entire equipment, exclusive of leads, weighs about 3 lb.

▶ **Calibration**—The instrument is calibrated by hanging weights from the handle, held in a horizontal position. By changing the length of the lever operating the brush shaft, the calibration may be adjusted within a rather broad range. A special screw, slider, and scum are provided for making this adjustment, which may be conveniently performed after removing the case cover.

Tests of a typical instrument show a maximum hysteresis of the order of 2 percent of full-scale value; thus the uncertainty in reading is about 1 percent of the full-scale range. The calibration curve deviates about 2 percent from linearity, and the sensitivity is about 0.5 percent of the full scale.

Performance Points to Pesco First!



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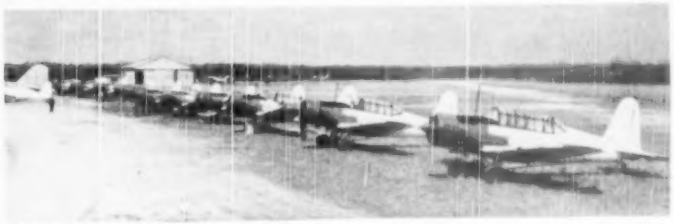
BIG B-18 carries 1000 gal. of insecticide, can spray a long, wide swath. Popular . . .



BT-13s seen at Tyler's Mineoqua, L. I., base, are licensed to take 100 gal. each.

Tyler Grows With Spray Boom

Big East Coast operator has large fleet busy all over the U. S. and is making plans to expand to Australia.

One of the country's largest spray-dust operators, Tyler Flight Service Corp., is up to its prop hubs in what looks to be the biggest year yet for agricultural aviation.

The company now has more than 20 pilots scattered over the country manning converted World War II trainers and bombers in the war against crop and forest pests.

Eight Tyler planes—seven Convair BT-13s and a Douglas B-18—are working over an estimated 212,000 acres of Oregon forests to stamp out the spruce bud worm. The company originally had contracted to handle 100,000 acres of this location...but two of the other operators slashing the total job have since dropped out, and Tyler is bounding off their spreads. On completion of this task, the planes will head eastward, filling other scheduled contracts in their path. Other groups are working through large southeastern areas.

▶ **Big Outfit Needed**—Operations on this scale require a big, well-seasoned organization. Many an aspiring dust-sprayer hoping to cash in on the boom in this field has learned this the hard way and sought other means of making his airplane pay its way. Nevertheless, there are still scores of hopefuls plunging into the business, plagging the big operators by underbidding, and then very often failing to handle the task properly.

Tyler's setup is a typical example of what it takes to keep going in this fiercely competitive spraying field. Ken W. Tyler incorporated his company in New York in March 1945. Its beginning was modest. He started with one re-worked Naval Aircraft Factory N3N-3 biplane trainer. He spent much of his time studying manuals, directed by formulas to fighting pests, plugging New York and New Jersey. Technicians from Standard Oil, Hercules, Presidio, Shell Oil and other companies helped.

▶ **Working Out the Bugs**—For the first three years the company did experimental work with various insecticides and dusters or applicators. In the course of this work, a little equipped machine shop was built up to produce spray equipment finally to meet the company's demands. In 1949 Tyler Flight Service left work for the last time.

Accordingly, the company bid on and was awarded a contract to spray the entire Cape Cod peninsula against the gypsy moth. The project entailed an area covering 207,000 acres. Into the battle Tyler threw a half-dozen biplane Waco, Stearmans and N3Ns, BT-13s, a Douglas B-18 converted twin-engine bomber, and three rented helicopters—the latter used for precision spraying around lakes, ponds and streams. It was a back-breaking job with planes and pilots starting at 4 a.m. and working seven days a week. A major problem was keeping the spray pipeline filled. The Cape Cod project established Tyler.

It takes superb piloting to carry out an operation of this scope. And because work is carried on far from home, the pilots must more often than not double as mechanics and work over the planes they fly.

But, the work is highly remunerative. Tyler pilots are said to receive a base pay of $80 weekly, plus $7 per diem expenses when away from the home base at Mineoqua, L. I., plus $2.50 per flight hour—and flight time generally exceeds 10 hours daily. Pilots put in about 500,000 flying hours per year.

The company has a full-time entomologist and staff, also a full-time salesman constantly on the road rounding up business.

▶ **Present Equipment**—Flying equipment now consists of three NAF N3N-3s, licensed to carry 65-70 gal. spray each, two B-18s (1000 gal. each), 15 Convair BT-13s (over 100 gal. each), 1 Waco UPF-7 (80 gal.), and 1 Stearman PT-17 used for dusting and able to handle 500 lb. at dust.

Helicopters are hired when needed. The company has a stock interest in the Gyrodyne Corp. of America. If contracts now being negotiated work out, it is said that Tyler plans to purchase several Helidyne craft from the company.

Tyler is anxious to get started in operating overseas, and if a favorable dollar exchange can be worked out, Australia will be the next scene of operations. It is estimated that about 30 BT-13s and original C-47s will be used there.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **Flight Films Available**—Airport operators interested in promoting aviation interest among local groups can obtain motion pictures free from several organizations. Shell Oil Co.'s series is entitled "How an Airplane Flies." It explains the theory of flight in simple terms. Write the company at 50 W. 50 St., New York, N. Y. CAA has about 150 film strips and 300 reels in a new catalogue. Films may be borrowed for two weeks. The catalogue can be obtained from CAA Third Region Office, O'Hare Field, Park Ridge, Ill.

LETTERS

He's Disillusioned

Your article in AVIATION WEEK June 12, "Let's See Today's Planes Today," has some very interesting facts. I would like to offer some comments.

To review a little history, about 1925, Curtiss built the first production line airplane, the Robin—which was a real three place airplane—for full sized people—it droughed along on 90 or 110 hp. (OX-5) at about 85 or 90 mph. It was quite stable and comfortable. However, it had big fat wings with struts hanging out in the slip stream.

A little later, a Cessna with a 145 hp. engine, no struts, and room for 3½ people, (issued at nearly 145 (advertised that way, anyway).

Then there was the Monocoupe, still with the struts, but a two place airplane with no restrictions on speed or aerobatics, which cruised better than 100 mph. on 90 hp.

All of these airplanes are about 20 years old, and yet we are supposed to look at the '49 and '50 models as today's airplanes. We still have the struts, we still haven't matched the performance of the Monocoupe or the Cessna, and besides that, one has to be a contortionist to climb into the so-called private airplane. There are exceptions, of course. The Globe Swift, the Navion and the Bonanza are quite easy to enter. They have performance, but look at the price.

From all appearances, the Cessna 140 is the old 1939 or '40 Linemaster. I have flown both quite a lot and I can't see enough improvement to mention.

I don't claim to be an expert, as I have only lived around airplanes since 1927, only manage to fly about 80 to 100 hours a month. I have tried to use private planes for business but with not too much success.

With no personal offense intended, I think a better title would have been "Let's Sell Yesterday's Planes Today." The record shows that few people keep planes very long or buy more than once.

One small group has endeavored to purchase a modern plane, with some real performance, set with low landing speed and ease of handling, the Stinson—a two place with retractable gear, clean design, good visibility and with speeds up around the 160 mark with 90 hp. This may be a little extreme compared to the present lightplane, but it is a good indication.

A year or so ago I took a plane on a cross country of a week or so. At one small airport in Pennsylvania, the string that supports the tail wheel cracked thru. Apparently, it was an old crack that had spread. Inflatable tires gave design with no thought of maintenance built in. The whole tail assembly had to be removed to get the new fitting to the fuselage. My loss was two days and cost the owner a lot more than it should have—not because the repair man stuck him, but because of the design which forced so many hours of labor for the small repair.

With the knowledge of aerodynamics that is available today I see no reason for trying to press these antiques off on the public. If I am not mistaken (I might be) the Cub is still using an airfoil of the first world war.

Is there any reason why a clean airplane cannot be built for the same price that these old fashioned barn doors are selling at?

Imagine the auto industry trying to sell Model T Fords. They know better. They modernized, built in some performance, brought the price to a level that could be afforded by many. They sell autos and don't have the worry of What's Wrong with the Private Car Industry.

The best cure for the lightplane market would be to follow the example of the auto industry and give the people something interesting. Maybe a Swift with tricycle gear, for about $2500, would be interesting to clubs—a fast airplane, easy to fly, stall resistant, and inexpensive to operate.

At the present, if I wish to take my family with me, I have to pay a minimum of $12 per hour (only by bargaining), other wise $15.00—not a modern four place airplane—an old design Stinson 150 which uses about 80% of power to get 110 with four people. If I want to fly above the airspeeds of 1930, I have to pay $20 or more per hour for a Navion or Bonanza. Result, I leave my family behind, drive, or go by airline.

Your reply with some answers that may prove I am disillusioned, will be appreciated.

L. W. LAWLER
2291 Hill Road
Westfield, N. J.

ALPA's Short Hauler

Your Apr. 17 issue with a full page in "Pilots' Idea of Short Haul Plane" caught my eye while catching up on AVIATION WEEK after a recent trip.

ALPA's specifications reminded me of specs a grocer in my neighborhood conversationally outlined to me as a way aviation probably could be improved for all.

Then lot of safety factors is substantial yet they agree to either a high wing or low wing configuration. Have they considered that a high wing job represents roughly a fixed-in weight over quite a few of the passengers and in a severe belly landing this weight is quite apt to flatten the fuselage like the proverbial pancake?

Many of the safety factors are the prime factors of airplane design and therefore should not have to "play a large part in ALPA's proposals." They state briefly "no electrical valves," but they don't say where to put all the kinks for the manually controlled valves.

Specifying engine exhaust heat for cabin, cockpit and thermal anti-icing is like a planner of home buildings specifying solar heat ... it can be done, but at the present time the most reliable and least expensive systems are installed. For long time reliability, low initial and maintenance costs and for weight saving, it is a fact, that combustion heaters far surpass engine exhaust exchangers.

In regard to safety alone, I challenge anyone to submit factual data which places engine exhaust exchangers above combustion heaters.

It may be said that my opinion is biased because I represent a combustion heater manufacturer yet, considering this possibility, where is there any untruth in my paragraph above? Years ago horse and buggy owners would shout, "Get a horse" to operators of the new tangled automobile and this situation is a similar example of ALPA specifying exhaust heat instead of combustion heaters.

I certainly don't intend to alienate any of my ALPA friends but perhaps the pilot or pilots making up these specs were fatigued from the high fatigue cockpit arrangement of present planes?

ARTHUR J. DROGE
8519 87th Street
Woodhaven, L. I., N. Y.

BOAC's Record

We noted on page 50 of the June 5 AVIATION WEEK, that AOA had made a record crossing from Shannon to New York in 11 hours and 37 minutes.

Although we did not publish anything on this subject, we had a crossing from Shannon to New York on May 27 of 11 hours and 10 minutes which, I believe, will constitute a record. The flight was in command of Capt. C. M. Longden with 41 passengers aboard.

ROWENE MILLER, Reference Assistant
British Overseas Airways Corp.
Western division
630 Fifth Avenue
New York 20, N. Y.

Turbo Cyclone

Knowing Irv Stone of old, it is routine performance when he does an exceptionally good job of writing and reporting, but I could not refrain from letting you know that all of us felt that he did an even more exceptional job in the story of the Wright Turbo Cyclone in the May 29 issue of AVIATION WEEK. We are deeply indebted to him for a competent, complete and altogether a fine piece of workmanship. . . .

LESLIE T. NEVILLE
Curtiss-Wright Corp.
30 Rockefeller Plaza
New York, 20, N. Y.

Another Australian

I want to let you know that . . . I see Trans-Australia Airlines copy of AVIATION WEEK regularly. I rate your magazine as right up amongst the best. It has advertisements, yes, but it has real information also, without one's having to spend so much time wading through the advertisements to see if there is any real meat in it.

J. J. DAVIES
Chief Maintenance Engineer
Trans-Australia Airlines
Melbourne C1, Australia

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...yet he hasn't had a Chest X-Ray!

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Yet he fails to take the simple precaution of a Chest X-Ray to make sure he does not have tuberculosis. *Not because he's opposed to the X-Ray. Simply because he is not sufficiently informed—or just hasn't taken the time and trouble, or does not realize the seriousness of the problem.*

A Chest X-Ray is the first step toward detecting tuberculosis in its early stages. And in its early stages it can be cured with the least loss of time from work.

So, if you're the man above, that one simple reason should make you get your Chest X-Ray—*today*. But listen, see how serious this really is:

Between the ages of 15 and 34, tuberculosis leads all other diseases as a cause of death—although at no age are you safe from TB. Yet, if everyone does his part by getting a Chest X-Ray periodically, and the majority of cases thus discovered are followed up, we can eliminate TB entirely as a public health hazard!

Will you do your part today? Get a Chest X-Ray. It may mean your life!

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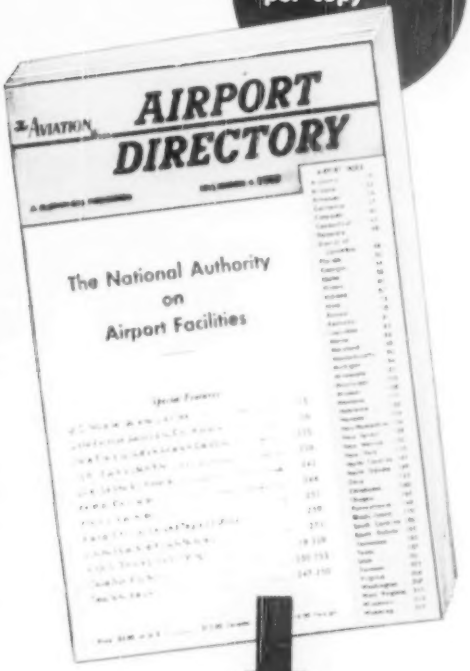

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Beechcraft Bonanzas serve as company-owned planes in almost every field of American business. More than 2,400 are now delivered. They slice travel time by two-thirds; give key men the incalculable advantage of any-time mobility. *Features* put this trim, exceptionally fast plane at the "head of the class"; make it *the* outstanding buy. Here are just a few of the features that make this greater than ever Beechcraft a better-than-ever value.

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Touches of luxury: four arm rests, four individual ash trays, special coat hanger rod to carry clothes with never a wrinkle.

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Now 196 h.p. at 2,450 rpm. Landing gear action speeded up: lowered in 7½ seconds, raised in 8½ seconds at 165 mph.

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Baggage compartment is accessible from inside or out. Room, too, for four big people in the smartly tailored quiet cabin.

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Beechcraft BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Trans-Atlantic Test: PAA vs. TWA

Opinion written before President approved PAA-AOA merger reflects earlier CAB thinking on competition.

TWA faced the biggest challenge in its 21-year history last week as the temporary legal barrier to Pan American Airways' absorption of American Overseas Airlines was removed.

A Federal judge in Washington, D.C., lifted a restraining order which for several days prevented the Civil Aeronautics Board from issuing its decision approving the PAA-AOA merger. The judge and CAB acted legally when, at President Truman's direction, it reversed itself and approved sale of American Overseas (AVIATION WEEK July 17).

More legal action over the decision is in prospect, and it will take some time to make formal transfer of AOA's assets. But except for contract details, Pan American's acquisition of AOA for $17,439,000 is a reality. In 1952, the whole North Atlantic route problem will come up before CAB again.

▶ **PAA Colossus Seen**—Can TWA alone compete effectively with a strengthened Pan American for the U.S. share of trans-Atlantic air traffic? Former CAB Chairman Joseph J. O'Connell, Jr., and member Russell Adams are convinced it cannot. They foresee an unequal struggle with a Pan American colossus which will result either in elimination of TWA from the trans-Atlantic picture or a decline in TWA's operations to comparative commercial impotence.

The two Board members' unissued opinion was based on the prospect that PAA would take over AOA's property, assets and business, including its service to 11 countries and its Constellation, Stratocruiser and DC-4 equipment. What O'Connell and Adams did not anticipate was that President Truman would overrule the CAB majority at the last minute and further extend Pan American by certificating it into Paris and Rome—two points where TWA previously had exclusive U.S.-flag rights.

To compensate for Paris and Rome, TWA was certificated to London and, temporarily, to Frankfurt, Germany. While the PAA-AOA merger became effective immediately, that part of the order giving new pairs of stops to Pan American and TWA will not be effective for at least 60 days.

▶ **Strength Compared**—O'Connell and Adams sized up Pan American before and after its acquisition of American Overseas. They decided that PAA, after the merger, would occupy a position of predominance in U.S. air transportation which would tend to stifle effective American-flag competition across the Atlantic. They pointed out that even without AOA, Pan American flew to 38 of the 72 foreign countries served by American-flag carriers. TWA, the next largest U.S. operator, flew to only 16 nations, of which nine were also served by PAA.

Pan American's route mileage in 1949 equalled 58 percent of the total operated by all American-flag carriers. Addition of AOA would increase this proportion to 65 percent.

The merger would boost PAA's share of total U.S. international air traffic from 63 to around 72 percent. With acquisition of AOA, Pan American would also hold 58.2 percent of the net capital assets of the American-flag international air transport system.

▶ **Monopoly Threat**—This, O'Connell and Adams observed, gives PAA a greater degree of control in its field than is the case in the most concentrated U.S. manufacturing industries. Even in the aluminum industry, they pointed out, only 55 percent of the resources are concentrated in the largest company, while in primary steel (an object of monopoly investigations) the percentage is 28.6 percent.

"These statistics lead only to one conclusion: That Pan American's acquisition of AOA would solidify PAA's position of overwhelming domination in international air transportation," the Board members declared. "With consummation of the merger, any attempt to preserve a reasonable competitive balance in our North Atlantic, European and middle East air transport operations would be doomed to utter frustration."

▶ **Challenge to Public Policy**—O'Connell and Adams warned that public policy should not be exposed to the overriding will and opinions of a single corporate management. They said they could not dismiss lightly allegations made against Pan American by opponents of the merger.

These allegations included charges that PAA and its officials had acted illegally or counter to public policy by fostering unfair and repressive competition "or by manifesting private greed coupled with an almost-callous disregard for both public convenience and public safety."

Action of repressive nature, such as that charged, is an expectable concomitant of undue aggregations of economic power in private enterprise, Adams and O'Connell declined. They argued that no adequate safeguards could be erected against the harmful consequences of the proposed increase in Pan American's competitive power stemming from the merger.

▶ **Bigger Subsidy Bill**—The two Board members said that instead of lessening trans-Atlantic subsidies by $9 million annually, as claimed by Pan American, the merger would lead to increased mail payments. Bigness, they observed, is often not synonymous with economy.

"Pan American has shown steadily increasing dependence on the government for financial support despite a marked improvement in volume and a relatively steady traffic demand. Objective results of PAA's operations compared with those of other international air carriers leave no alternative to concluding that its absorption of AOA would result in greater demands for mail pay than would be the case through continued separate operation of the two companies."

O'Connell and Adams said AOA's operations had been successful, its capital structure was sound and it faced no unusual equipment or financial problems. They saw no reason to believe that American Overseas couldn't continue independent operations with reasonable prospects of success.

Although CAB member Harold Jones also favored rejection of the mer-

WINNER AND STILL CHAMP

Last minute White House action reversing CAB's disapproval of the PAA-AOA merger literally ties the adverse decision from the Board's mimeograph machines and provided PAA President Juan S. Trippe with a signal, last-stage Washington victory.

Financial Analysis

How Merger Deal Affects Companies' Finances

In addition to fundamental adjustments in the international route pattern, American Overseas Airlines' acquisition by Pan American World Airways will have a major impact on the finances of no less than four carriers. Inasmuch as this transaction will influence the operation of competitive airlines, it may be said that such companies may also be affected.

Once the last doubts and obstacles are removed, major managerial determinations, long held in abeyance, will be in a position to go forward.

▶ **Controversy Aroused**—It must be realized that this proposal was first launched on Dec. 13, 1948, amidst much controversy. Originally it was hoped to obtain a quick, favorable decision by Sept. 13, 1949. The procedural steps were slowed down considerably by opposition from various quarters.

After the transaction traversed the entire course, beset by unprecedented obstacles and bitterness, the same conditions no longer prevail today that existed more than a year and a half ago.

- **Korean incident** may well change the role of all international airlines.
- **Mail pay questions** for the foreign lines have become more complex.
- **Certain flying equipment** of AOA is depreciated to a greater degree because of the time factor and no longer compares as favorably with the more advanced type of the same series.
- **Introduction of key route** changes as a condition of approval to the sale of AOA requires a new re-approval on the part of Pan American.

Only when the sale is finally and well major managerial decisions be possible by companies in the orbit of the transaction. The sale may be considered completed and final only at the point when AOA receives the purchase price of $17,450,000 in cash for all of its assets from Pan American and not before.

▶ **Book Loss**—American Airlines, owning 61.9 percent of AOA's stock, will thus receive more than $10.8 million in this purchase. American, however, in this event, will suffer a book loss of about $1 million in the transaction. Of greater consequence is the speculation which will be placed in motion on the company's fiscal policies.

As of Dec. 31, 1949, American had a net working capital of more than $10.6 million. In addition, it had provided a special fund of $13 million toward the purchase of 11 DC-6s for delivery next year. With cash now being built up rapidly through earnings and depreciation throw-off, finances are being bolstered even further. If the cash to be realized in the AOA deal is added, the company will definitely find itself in command of funds well in excess of its normal operating requirements. Of the original $40 million 3 percent debenture issue outstanding, American has already retired $4,050,000, anticipating sinking fund requirements for the years 1951, 1952 and 1953.

▶ **AA Dividend Possible**—Under the indenture relating to the outstanding debentures, American may not pay cash dividends on the common stock or purchase any of its preferred stock, except to the extent its earned surplus exceeds $10,640,742. The company is believed to have passed this point by this time. Accordingly, with the presence of normal earnings, a cash dividend on the common stock this year would appear to be in order.

Of greater significance, the AOA cash may find application in the retirement of additional debentures, along with the outright purchase of some of the 400,000 shares of $100 par value of preferred stock outstanding, now selling at a substantial market discount.

American Export Lines, Inc., which established American Overseas Airlines, Inc. American Export Airlines on April 7, 1937, will not fare badly in the AOA sale. Following its forced sale of its majority interest by CAB order in 1945, American Export, through a wholly-owned subsidiary, now owns 335,704 shares or 20.5 percent of AOA's outstanding shares.

American Export carries its AOA investment at a book value of $2,102,406. With its sale it should realize a book profit of some $944,000, or about 36 percent over its book value. Further, after liquidating a bank loan of $2,108,406 secured by the AOA stock, American Export should add about $1,458,000 in cash before tax provisions to its corporate funds.

Pan American has special arrangements on its financial affairs to handle this acquisition. Toward this end, the company on Sept. 20, 1949 entered into a new bank loan agreement permitting it to increase its borrowings from $40 million to $59 million. The additional credit of $19 million is related completely to the acquisition of AOA. Of this amount, $10 million was borrowed on March 31, 1950, and invested in short term U. S. government securities, pending the outcome of the deal. The remaining $9 million may be borrowed on or before Sept. 30, 1950, or a date ten days after the acquisition of the assets of AOA, whichever occurs first. It is significant, that a condition in this agreement specifies that if the assets of AOA are not acquired by Sept. 30, 1950, such $9 million cannot be borrowed and the $10 billion borrowed on March 31, 1950 must be repaid immediately.

▶ **Can Help PanAm**—It has also been revealed that in finally putting its stamp of approval on the transaction following Presidential direction, the Civil Aeronautics Board stated that this acquisition will not impair the financial ability of Pan American.

This acquisition can do much to alleviate Pan American's need for additional flying equipment. On its Atlantic division, it was last reported as flying 9 Stratocruisers, 14 Constellations and 47 DC-4s. AOA could supply 8 Stratocruisers, 7 Constellations and 6 DC-4s. In this acquisition, Pan American would have an indicated paper profit of some $4 million on the AOA Stratocruisers as they would be acquired at a price estimated at $500,000 below current replacement costs per plane. The 7 Constellations, while of the old type, would also come at a depreciated book price and represent an important asset in Pan American's airlift requirements.

Of course, AOA itself, as a corporate entity, is confronted with many liquidating adjustments. Among other things, AOA's claim for additional mail pay for past periods exists and would be assumed by Pan American. Then there is the intricate question of absorbing the various employees of the company.

There is little doubt but that the AOA-Pan American case has caused more repercussions and will have left its permanent imprint on the finances of more major carriers than any other previous proceeding in CAB history.

—Selig Altschul

WORKING ON THE RAILROADS

Vice Admiral Emory S. Land, president of the Air Transport Assn., recently teamed up with leaders in other forms of transportation for a television discussion of the subject: "All the Railroads Want Is a Fair Deal." Appearing on the National Broadcasting Company's "American Forum of the Air" program were, left to right, Robert S. Henry, vice president, Assn. of American Railroads, Adm. Land; Moderator Theodore Granik, Chester C. Thompson, president, American Waterways Operators, and Walter S. Belson, director of public relations, American Trucking Assn. Outnumbered three to one, the lone railroad representative fought a vigorous rear-guard action.

get, he did so for different reasons. He said there was no proof that Pan American would dominate TWA if the deal were approved. And, he declared, there was no showing that PAA's motive is to create a monopoly. But, Jones concluded, facts do not warrant reshuffling North Atlantic routes at this time.

▶ **Ryan, Lee Dissent**—Both CAB Vice Chairman Oswald Ryan and member Josh Lee said economies would result from the merger, even though they thought not be as much as the $9 million annually estimated by PAA. Ryan said the taxpayer was the forgotten man in the minority opinion. The merger, Ryan contended, would not kill trans-Atlantic competition, but only its uneconomical aspects.

The vice chairman noted that conditions under which American Overseas was certificated in 1945 have changed radically. The carrier cannot serve its points in Russia, Poland or eastern Germany. And competition from foreign flag lines has been stronger than anticipated.

Ryan said acquisition of AOA would make a relatively minor change in PAA's size and position in the airline system. He declared that PAA dominance must have existed before the merger if it exists at all.

▶ **No Stifling Expected**—TWA will not be stifled by Pan American, Ryan continued. He said TWA already flies 40 percent or more of the passenger traffic on U. S. trans-Atlantic routes and is the dominant carrier in the area.

Elimination of AOA would further strengthen TWA's position, Ryan declared. He described TWA as a "formidable" air carrier, not a weak and fragile competitor.

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mission that it should spend $125,000 to install high intensity lights at Honolulu Airport. Earlier the commission had planned to use the money to convert surplus military barracks into housing.

Plans Pushed for Japanese Home Line

Plans for organizing and operating a domestic Japanese airline under the control of foreign carriers are being pushed following approval of the project by General MacArthur's Allied Headquarters.

Domestic Japanese airline services were discontinued by order of occupation authorities in 1945. But the rugged nature of the Japanese islands, combined with inadequate railroad and highway connections, has made commercial air links necessary.

Gen. MacArthur said participation in the new Japanese operation would be limited to international airlines flying into Japan prior to Jan. 1, 1950. These carriers include: Northwest Airlines, Pan American Airways, Transocean Air Lines, Qantas Empire Airways (Australia), British Overseas Airways Corp., Canadian Pacific Air Lines, Philippine Air Lines and Civil Air Transport (China).

Korea Airlift

Ten percent of airlines' 4-engine equipment is already mobilized.

U. S. scheduled and nonscheduled airlines have already mobilized more than 10 percent of their four-engine equipment to meet military transport needs in the Pacific.

This first 10 percent, airline officials report, caused few major curtailments in commercial service. But any additional demands for equipment by the military are likely to prove painful to the industry.

Combined four-engine fleet of U. S. domestic and international airlines numbered 519 at the outbreak of the Korean War. These included 272 DC-4s, 113 DC-6s, 86 Constellations, 42 Stratocruisers and 6 Boeing Stratoliners.

► **65 Planes Furnished**—By the first of last week about 65 commercial transports were either in the Pacific airlift or undergoing modifications to ready them for such operations. The certificated airlines accounted for about 46 of these planes.

Of the first 23 transports chartered by the military, Pan American Airways supplied 10, United Air Lines 2, Flying Tiger Line 3, Northwest Airlines 2, Seaboard & Western Airlines 6, Trans-

ocean Air Lines 6 and Overseas National Airways 4. Most of the planes were DC-4s.

Additional planes were slated to come from American, American Overseas, Braniff, Capital, Delta, Eastern, National, Northwest, Panagra, TWA, United and Western.

The Air Transport Assn. is serving as Coordinator in making the airlines' chartered equipment available to the military.

▶ **Pilots Recalled**—Pan American, which has a pair of Stratocruisers in the airlift in addition to eight DC-4s, recalled 144 furloughed pilots to active status. Operation of each ship on the West Coast-Japan run requires about four crews consisting of captain, copilot and navigator.

Seven certificated airlines, acting as subcontractors, are furnishing planes and crews to Pan American. The carriers, and equipment provided, are: American, 7 DC-4s; American Overseas, 1 Stratocruiser; Capital, 2 DC-4s; Eastern, 4 DC-4s; National, 1 DC-4; Panagra, 1 DC-4; and Western, 1 DC-4.

Northwest has called back 79 crew members, including 50 pilots and 20 navigators, from the furlough list. NWA has chartered two DC-4s to the military, and a third is to be made available.

In addition, Northwest has subcontracting arrangements whereby TWA will provide four aircraft, Braniff 1 and Delta 1. NWA crews will be used in some of the subcontracted planes.

▶ **Cargo Planes Needed**—Freight and combination passenger-cargo planes have been the biggest source of emergency airlift. Capital Airlines, for instance, contributed two of its four cargo C-54s and set to work immediately to convert them for the long range, overseas operation. Company officials hoped to increase utilization of their remaining freighters so that commercial shipments would not be affected.

Commercial aircraft already chartered to the military represent a theoretical peak for the present. Maj. Gen. Laurence S. Kuter, Military Air Transport Service commander, said recently that only 25 percent of the airlines' four-engine planes are capable of carrying cargo efficiently, and that only 10 percent were able to satisfy military range and performance needs—2500 miles nonstop.

Industry observers believe, however, that if the need arises the 10 percent ceiling will be broken quickly.

▶ **Foreign Threat**—Meanwhile, equipment contributions of U. S. flag carriers to the Pacific airlift opened the possibility that foreign operators may be able to take away more business from American lines.

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WEEK that foreign countries which acquired new long-range transports with the aid of American ECA funds should be willing to help us in the Pacific airlift.

He said this would be a comparatively easy way for North Atlantic Pact countries to give material support to the United Nations action in Korea. "It would be grossly unfair for other nations to use their American-financed equipment to drain away the business of U. S. carriers whose planes are diverted to the Pacific," Kem declared.

Center-Line Test

CAA weighs installation of the ALPA-supported approach light system.

A pilot-endorsed, center-line, high-intensity approach light system featuring super-bright, condenser discharge flashers may be tested by the Civil Aeronautics Administration.

The system incorporates the revised configuration proposed by the Air Line Pilots Assn. two months ago as the military-civil standard for the United States (AVIATION WEEK June 19, p. 47). CAA's present high-intensity lighting program contemplates installation of the dual-row, funnel-shaped slope line configuration and the left-hand, single-row configuration but makes no provision for using the center-row.

▶ **Cost Problem**—ALPA opposes both the left-hand and dual-row slope line configurations of high-intensity approach lights. The union wanted at least five airports equipped with its center-line system. But it was indicated that such a program would cost up to $1 million.

Under the present plan, CAA has agreed to make surveys to ascertain the cost of installing a center-line system with condenser discharge lights and a crossbar 1000 ft. out from the runway end. Site selected would probably be along the Eastern seaboard.

Newark Airport already has a set of Sylvania condenser discharge lights in a left-hand row arrangement. These lights, or possibly Westinghouse units that have been used at Atlanta, Cabot, and Cleveland, could be used for the new center-row experiment.

▶ **Strobeacon System**—The Sylvania condenser discharge lights at Newark were originally installed in 1946 and are known as the Strobeacon system. Heart of the Strobeacon is its high-intensity electronic flash tube employing xenon gas to obtain a quality of artificial light approaching sunlight.

Light flash generated by the Strobeacon tube measures over 200 million peak lumens. Its duration is less than a

thousandth of a second. Both the intensity of the light and duration of the flash are designed to give maximum penetration of overcast without blinding effect.

The split-second bursts of light from the Strobacon resemble flashes of lightning pointing toward the runway.

▶ **Other Lights Needed**—ALPA says the condenser discharge lights alone are not adequate as approach lights. The units show the direction and track to the runway. But the union says they are deficient in depth perception and should be used in conjunction with steady-burning linear light bars.

As originally installed at Newark, the Strobacon unit consisted of a 7-ft.-long steel box housing four steady-burning horizontal neon tubes 6 ft. long, with the flasher in the center. The units could be operated with red neon alone, flashing light alone, or combinations of both.

ALPA's system would dispense with the neon bars. The flash unit would be mounted separately in front of each standard 14-ft. slope line bar fixture containing 10 sealed-beam, 400-watt lamps.

The Westinghouse flash unit, employing a krypton-filled quartz tube, was designed to be separate from steady-burning blaze units. A polished parabolic reflector concentrates output of the Westinghouse krypton lamp into a beam of 3.3 billion candlepower at maximum brightness.

CAB Finding Favors Hughes in TWA Case

Howard Hughes' action in expanding his control of TWA early in 1947 was in the public interest and saved the carrier from "utter financial failure in the darkest hour of its history," according to Civil Aeronautics Board examiner Edward T. Stodola.

The examiner's findings were made as a result of CAB's investigation into transactions whereby Hughes Tool Co.'s stock interest in TWA was boosted from 45 percent to 73 percent. The 45 percent control was approved by the Board in 1944.

▶ **$10 Million in Notes**—Hughes Tool Co.'s purchase of $10 million of TWA's convertible notes came at a time when the carrier had suffered severe operating losses and was unable to raise additional equity capital. Stodola observed, however, that Hughes officials erred in not coming to terms with TWA's management (then headed by Jack Frye) for the purpose of promoting a substantial measure of equity financing. Failure to do this when the market was good right after the war resulted in excessive amount of debt financing later, the examiner declared.

CAB public counsel had requested Stodola to recommend to the Board that this proceeding be used as a case history to show the need for CAB control over the airlines' capital financing. The examiner said he too is convinced of the urgent need for public control of airline security issues to assure sounder financing. But he noted that public counsel's procedure would be unfair to TWA since other carriers suffered almost as severe financial disabilities during the postwar period.

Under the circumstances, Stodola declared, CAB ought to use the experience of the entire industry in support of its recommendations to Congress for control over airline security issues and capital structures. The Board has been seeking this power, through amendment of the Civil Aeronautics Act, since 1942.

Mexico Turns Down EAL Route Permit

(McGraw-Hill World News)

Mexico City—Mexico has again rejected a United States proposal which would have permitted Eastern Air Lines to activate its long-dormant route from New Orleans to Mexico City.

The U. S. suggested that Mexico grant the route permit to EAL in return for an Aeroméx grant traffic drop at

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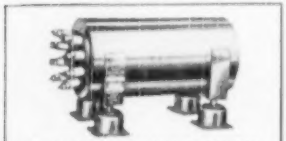

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Miami en route to Madrid. Aerovias Guest—100 percent Mexican-owned—can now make gas stops at Miami but may not pick up passengers there.

Eastern was granted the Mexico City route in the Civil Aeronautics Board's Latin American case decision more than four years ago. E. V. Rickenbacker, EAL president, has said repeatedly that he is ready to spend a half million dollars just to promote the route. Eastern already has a large building in Mexico City in anticipation of acquiring operating rights.

Mexico has two reasons for refusing to grant Eastern permission to activate its New Orleans-Mexico City route: First, no 100 percent Mexican line is considered ready to fly the link; and Mexico wants to get in on the ground floor when the route is opened. Secondly, Pan American Airways and American Airlines, which already fly into Mexico, have considerable influence with Mexican officials, and these carriers would be the ones to lose most by EAL's competition.

Mexico originated the most recent negotiations with its request for additional rights for Aerovias Guest. When the U. S. countered this request by seeking a permit for EAL, Mexican officials mulled the deal over for six months and rejected it. No further action is planned for the present.

Net result will be increased bad feeling between aviation officials in the two countries. Mexico has long contended that she gives the U. S. operating rights on eight routes for every one she gets in return, and that it was only reasonable that Aerovias Guest receive its permit with no strings attached.

Terminal Facilities For Nonskeds

Teterboro Airport, which enjoyed a resurgence in popularity by welcoming nonskeds, took another step recently to make its irregular customers feel at home. Walter E. Lapp, president of Teterboro Air Travel, a nonsked ticket agency, opened a new terminal building catering exclusively to the approximately 20 nonskeds operating out of the field.

The new single-story structure includes a flight operations office, a passenger waiting room (capacity over 100), snack bar and rest rooms. Adjoining is a plane ramp with a capacity of about six C-46s. Parking on the ramp is free for the first twelve hours.

A half dozen irregulars are already using the terminal to centralize their passenger handling, weighing, and making up of manifests. Lapp's limousine service, operating from the building provides the carriers with a ready means for transporting passengers.

Airline Navigators Seek ICAO Voice

Airline navigators from all countries have banded together to obtain representation in the workings of the International Civil Aviation Organization. The new group, called the International Airline Navigators Council, will propose that ICAO set up uniform standards for licensing and employment of airline navigators.

IANC plans to concentrate on technical problems of the profession and leave labor and political issues to already established craft unions. But it is going to be difficult for IANC to divorce itself entirely from highly controversial issues. For instance, it opposes the move by some airlines to eliminate navigators and hand this job over to the pilot. IANC believes this is a "technical" matter directly bearing on safety. Local navigators unions and the airlines may be inclined to consider this point a labor issue.

The new organization just recently concluded its first convention in New York City. Elected as chairman was John D. Nicholas, of TWA, also an executive committee member of the Air Line Navigators Assn., Local 520, TWU-CIO; vice chairman is Henri Alnun, Air France; and acting treasurer is Francis A. Harland of TWA.

The group plans to hold its second meeting next year in Paris.

Nonsked Agencies Set Business Code

Nonscheduled airline ticket agencies have launched a drive to eliminate their own unethical business practices and to help the irregular carriers with which they deal.

A group of New York City travel agents agreed to avoid cutthroat tactics in making ticket sales. They also made a financial contribution toward the war chest being raised by nonscheduled airlines fighting the Civil Aeronautics Board's stiffened economic regulations.

Better Business Bureaus have kept the nonscheduled carriers and their ticket agents under fire for misrepresenting their rates and services.

SHORTLINES

▶ **Air Express**—Domestic shipments during May rose 27 percent over the same month last year, and gross revenue jumped nearly 31 percent.

▶ **Arctic-Pacific, Inc.**—CAB has ordered the Seattle nonsked to cease and desist from leading the public to believe it offers regular air service between any

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two points. The company was barred from operating more than eight roundtrips between any pair of points during any four-week period, or between any two points in the same direction on the same day of two or more successive weeks.

▶ **Associated Aviation Underwriters**—Has arranged to have stamp vending machines placed beside each of its airline trip insurance machines, which dispense $5000 policies for 25 cents.

▶ **Braniff**—President Truman has created an emergency fact-finding board to investigate a labor dispute between Braniff and the Brotherhood of Railway and Steamship Clerks, which represents about 1200 of the airline's ground personnel. The union had threatened to strike all Braniff stations in the Southwest because of failure to reach agreement on a contract. Presidential action prevents a walkout for 60 days.

▶ **BOAC**—Has reached an agreement with South African Airways on services to be operated in partnership between London and Johannesburg when both carriers introduce new type planes on the run later this year. BOAC will make three roundtrips weekly with Handley Page Hermes transports via Tripoli and Leopoldville, and SAA, using Model 749 Constellations instead of DC-4s, will make three trips weekly via Nairobi, Khartoum and Rome. SAA has taken delivery of the third in a fleet of two Connies.

▶ **Capital**—Earned $214,668 net profit in May against $173,516 in the same month last year. June cargo traffic totaling 1,010,073 ton miles set a new company record. Cargo revenue in first half 1950 was up nearly 31 percent over last year. Capital's air coach services accounted for 16.6 percent of systemwide passenger revenues, 22.3 percent of express revenues and 6.7 percent of freight revenues from Nov. 4, 1948, to Apr. 30, 1950.

▶ **Colonial**—June passenger business to Bermuda was up 143 percent over the same month last year.

▶ **Continental**—Revised figures give the carrier a $54,800 profit for 1949 compared with $147,003 profit in 1948. Prior to a recent upward revision in mail pay rates, CAL had shown a $229,000 net loss in 1949 (AVIATION WEEK June 19).

▶ **National**—During the fiscal year ended June 30 flew 48 percent more passenger miles than in the previous fiscal year. June traffic was up 43.6 percent over last year.

▶ **Overseas National Airways**—Has received a temporary exemption from CAB authorizing a maximum of seven roundtrip flights this summer between the United States and Geneva, Switzerland, under contract with the International Council of Christian Churches. Prior requests by ONA for trans-Atlantic group charter flight authorizations had been rejected by CAB, but the carrier recently demonstrated to CAA that it is capable of complying with all requirements.

▶ **Panagra**—Has cut rates for DC-6 sleeper berths more than 50 percent.

▶ **Pan American**—Traffic between Seattle and Alaska during first half 1950 set an all-time record.

CAB SCHEDULE

July 25—Oral argument in Cuba-Florida foreign air carrier permit case. (Docket 2212 et al).

July 27—Hearing on Board's investigation of transPacific coach excursion fares. (Docket 4125).

July 28—Oral argument on CAB's enforcement action against Midwest Air Transport. (Docket 4100).

Aug. 7—Resumption of hearing in enforcement proceeding against Trans American Airways, Great Lakes Airlines, Golden Airways, Edward Ware Taber and Sky Coach Airways, Inc. (Docket 4165).

Aug. 7—Hearing on TWA and American Overseas Airlines requests to suspend service at Philadelphia on trans-Atlantic routes. (Docket 4028 et al).

Aug. 7—Hearing in West Coast Airlines-Southwest Airways merger case. (Docket 4091).

Aug. 14—Resumption of hearing on renewal of Southwest Airways' feeder service, fares and service suspension at certain United Air Lines points in the area. (Docket 1718 et al).

Aug. 16—Resumption of hearing on renewal of West Coast Airlines feeder certificate and service suspension at certain United Air Lines points in the area. (Docket 2088 et al).

Aug. 18 or 21—Hearing on renewed request for additional California-Nevada service. (Docket 2019 et al).

Sept. 11—Hearing on Jackson Brothers, interlocking relationships and proposed purchase of free holding airline stockholdings. (Docket 3806 et al).

Sept. 11—Hearing on enforcement proceeding involving interlocking relationships between Airway Airways, Inc. and Cuban Airways. (Docket 4065).

Sept. 11—Hearing on application of American, Q-T and Cubana de Aviacion for Havana-Washington-New York foreign air carrier permits. (Dockets 2215 and 4126).

Sept. 18—Hearing on renewal of Pioneer Airlines feeder certificate and service suspension at certain United Air Lines stations in the area. (Docket 4166).

Sept. 20—Hearing on Mid-Continent Airlines application to serve the cities of Omaha (Open-Omaha) route permanent. (Docket 3966).

Oct. 3—Hearing in Lake Michigan Airways case. (Docket 4146 et al).

Oct. 16—Hearing on Los Angeles-Honolulu application for renewal of 15 [illegible] mail pay rates, and for additional authority to carry passengers. (Docket 3966).

Jan. 8, 1951—Hearing in New York-Miami case, and CAB determination of the carriers' economic and efficiency. (Docket 2019 et al).

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(Continued on opposite page)

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STRICTLY PERSONAL

SPECIAL DISPATCH FROM DE HAVILLAND—Strictly Personal's exclusive news service brings this bulletin from the latest de Havilland Gazette (Britain):

(1) De Havilland has no helicopter because "we've got enough people going around in small circles already."

(2) A paper by an installation engineer says: "The shape of the engine mounting rubbers was first worked out very carefully by technical methods, and then it was designed according to what would be reasonable."

* * *

THE THREE'LL GO UP FOR A STRETCH—Next to the flying saucers, the publicity idea of Tucson Airport Manager **Bob Schmidt** are probably the most spectacular products of the Southwest these days, says AVIATION WEEK's man **Hopalong Charlie Adams**, just back a few weeks from the West.

One of the biggest men in aviation (6 ft. 2 in. and 245 lbs. minus his cowboy boots), Schmidt believes firmly that even if you have a better mousetrap (or airport) you can still lose your shirt waiting for the public to find out about it so's they can beat a flight path to your door.

Schmidt's current promotion is rubber dollars—about 1500 of which have been distributed since last fall—and picture postcards with an earthy touch (which we reprinted in this column recently).

Schmidt's high velocity dollars got some unexpected circulation last fall when Bob was attending the annual convention of the NASAO in Old New Orleans. While visiting the French quarter he found himself at the Absinthe Bar with some CAA airport officials. Came time to pay and Schmidt inadvertently pulled out a wad of his funny-money along with a few pieces of legal tender. Shortly thereafter some character bumped him, dipped a quick hand into Schmidt's pocket and scuffled out with some $15 in honeying bucks.

* * *

THIS PLANE IS SIMPLY DIVAN—We have before us a "technical description" of a new Italian transport, the Aer. Macchi B 320, written and submitted to us by an Italian writer. We pass along a summary for you technical readers:

> The MB 320 is a low-wing 2-motor monoplane with 3-wheel retractable undercarriage, for 6 people, including the pilot, equipped with Continental E-185 motors.
>
> The pilot's cabin has double command, but the steering wheel at the right is easily demountable. . . . Construction is wooden. . . . The wing flaps are the bent tongue type, permitting systematically satisfactory flapping in take-off and in efficient braking.
>
> The fuselage, shell structure, is sub-divided into four sections: a front metallic demountable section, a central trunk constructed in one piece with the wing, a rear trunk comprising the fin and the stern.
>
> Access to the cabin is by means of two ample doors, on the left side. The front door gives access to the pilot's cockpit and the front divan, the back door to the back divan and the luggage space. . . . The fin is constructed in one piece with the fuselage and the rudder is equipped with correction fins. . . . The front wheel is orientable and can turn at 360 degrees. The front part retracts toward the bow of the plane with a forward movement. The back section folds up to the motor gondola with a backward movement. The retraction of the undercarriage is hydraulically controlled, is very quick, and guaranteed also in case of the stoppage of a motor.
>
> Utilization of the plane: The 2 passenger divans are fixed with four bolts, demountable with the maximum speed. Equipped for medical service it can transport 3 wounded, 2 in stretchers and one in armchair plus a nurse.

* * *

FROG CALLERS FROM OSHKOSH—Our road correspondent, **Bert Reichert**, of Beaver Dam, Wis., flashes in that **Kenneth Scarland** and other Wisconsin Central personnel are getting pretty adept at frog calling. Ken is WCA station manager at Oshkosh, and he has been on the sending end of Operation Leapfrog for some time now. The country around about Oshkosh is swell for frogs. So laboratories that use fresh frogs for their medical research need for the local product. WCA finds itself exporting lots of frogs in specially built frog boxes packed with damp moss. Bert says one WCA employee once opened up a box on a flight just to see what the passengers were up to and he and a fellow crewman spent the rest of the trip scrambling around a dark wing surface of the ship trying to round up about 50 lively DP's.

* * *

IT'S PART OF THE FAMILY PLAN—The Delta Digest says it must have been a baseball fan who called Chicago reservations, got all the answers to the usual questions about service, and then asked "Don't you have a Ladies' Day?"

—R.H.W.

WHAT'S NEW

What Others Say

FORTUNE MAGAZINE (July) traces the development of **Slick Airways** and, in passing, comments on the growth of air cargo following the war. In essence, Fortune says Slick is racing against time—trying to build up its freight revenues before its overhaul and maintenance revenues drop so far as to make the losses ruinous. Concludes the magazine: "Whether (Earl Slick) is smart enough—and lucky enough—to push his company into a commanding position in a great new industry is a question that still trembles in the balance."

CONSUMER REPORTS (June) analyzes **air coach** economics from the public's standpoint, and draws a bead on some of the Civil Aeronautics Board's arguments that air coach is still an experiment to be handled gingerly.

The magazine bases its case principally on the Los Angeles-San Francisco operation and the report of the California Public Utilities Commission which investigated the LA/SF service. Consumer Reports lists the major reasons given by CAB officials for hedging on air coach. Of some of these it says:

Success of the California 340-mi. intrastate service "disposes of this argument" that coach can be successful only over long-haul routes.

The California service shows high profit rates at 3 cents a mile "without any mail contracts at all" while CAB claims "if fare levels are permitted to come down, . . . the need for airmail subsidies may go up."

"The very terms and conditions set by the CAB serve to undermine the validity of the experiment. To put it plainly, the dice are loaded against the success of 4-cent fares."

The magazine also examines the subsidy question: "The mail subsidy issue is far less important than airline critics suggest. Subsidy estimates are inflated by assuming that the airlines are under some obligation to carry mail at cost, rather than at the rate users of airmail are willing to pay. . . . Actually, it could be argued that the alleged 'subsidy' is chiefly a bookkeeping transaction: the government in 1949 collected around $58,000,000 in excise taxes from domestic air travelers, plus a 14-cent-a-gallon tax on aviation gasoline. . . . The simple fact is that for more than a century American policy has been to encourage the expansion of all forms of transportation, and air travel is benefiting from this policy today just as the railroads benefited in times gone by."

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JULY 24, 1950

Adam-Rite Mfg. Company 5
Agency—The Shaw Company

Adel Precision Products Corp. 36
Agency—The McCarty Company

Aero Instrument Corp. 51

Aerotec Corporation, The 32
Agency—Heuing & Company, Inc.

Air Associates, Inc. 27
Agency—J. Branch Briggs Adv.

Aircraft Radio Corp. 7
Agency—Burke Dowling Adams Adv.

Beech Aircraft Corp. 44
Agency—Erwin, Wasey & Co., Inc.

Bendix Products Div. of Bendix Aviation Corp. ..... Third Cover
Agency—MacManus, John & Adams, Inc.

Bristol Company, The 52
Agency—Jones Thomas Cheney Co.

Control Products, Inc. 54
Agency—George Henry Martin Associates

Dill Mfg. Co., The 51
Agency—McDonald, Fisher & Spelman Co.

Eaton Manufacturing Co. 23
Agency—Clark & Rickard, Inc.

Electric Auto-Lite Co., The 19
Agency—Rathwell & Ryan, Inc.

Essex Brass Goods & Machine Corp. ..... Fourth Cover
Agency—The Belden Company

Gibbs Engineering, Inc. 48
Agency—Houck & Co. of Florida

Garrett Corporation, The, Airesearch Mfg. Co. 3
Agency—J. Walter Thompson Co.

Goodyear Tire & Rubber Co., Inc. ..... Front Cover
Agency—Kudner Agency, Inc.

Holo-Ace, Inc. 29
Agency—John H. Bonham Co.

Koppers Company, Inc. 47
Agency—Vansant, Dugdale & Co., Inc.

Lavelle Aircraft Corp. 8
Agency—Bromfield-Pedisore Adv.

Lord Manufacturing Co. 57
Agency—W. S. Hill Co.

Marman Products Co., Inc. 31
Agency—West-Marquis, Inc.

Marquette Metals Products Co., The 29
Agency—Belden & Hakes Adv.

Martin Co., The Glenn L. 30, 31
Agency—Vansant, Dugdale & Co., Inc.

Minneapolis-Honeywell Regulator Co. ..... Second Cover
Agency—Allison Lewis & Associates

New Departure Div., G.M.C. 4
Agency—J. M. Hickerson, Inc.

Pacific Div. of Bendix Aviation Corp. 33
Agency—The Shaw Company

Paper Manufacturers Co. 45
Agency—Charles A. Wilson Jr. & Co.

Power Products Company 17
Agency—Fuller & Smith & Ross, Inc.

Pneudi Tool Company 4
Agency—Willard G. Gregory Co.

Porter Tools 4
Agency—Willard G. Gregory Co.

Searchlight Section 14, 15

Shell Oil Company 53
Agency—J. Walter Thompson Co.

Snap-On Tools Corp. 50
Agency—Stack, Incorporated

Sperry Gyroscope Company 6
Agency—Lennen Newell, Broad Vis, Inc.

Standard Aircraft Equipment Co., Inc. 17

Standard Pressed Steel Co. 14
Agency—R. T. Jordan Corp.

Steel Products Engineering Co., The 41
Agency—Gerson Speed & Gerger, Inc.

United Aircraft Corp. 13
Agency—Fitz-Gerald, Inc.

United States Steel Corporation 11
Agency—Batten, Barton, Durstine & Osborn, Inc.

Western Gear Works 9
Agency—West-Marquis, Inc.

PROFESSIONAL SERVICES ..... Last page of classified section

SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Wanted 54
Positions Wanted 54
Selling Opportunities Wanted 54
Employment Agencies 54

EDUCATIONAL
Schools 54

BUSINESS OPPORTUNITIES
Offered 54

PLANES—EQUIPMENT
Planes or Service Now For Sale 54

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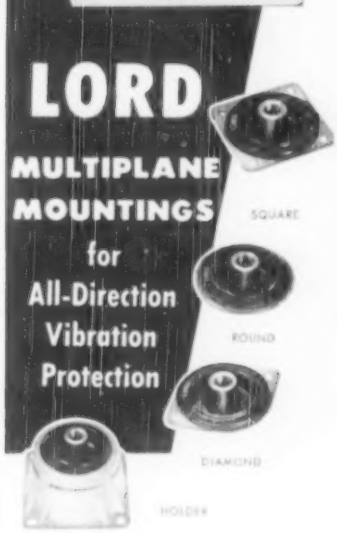

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LORD

Vibration-Control Mountings . . . Bonded-Rubber Parts

EDITORIAL

Can We Help You?

Do you think AVIATION WEEK could help you more in your work than it does already? How can we improve this weekly business and technical intelligence service for you?

We are making improvements right along. Our added coverage of Equipment, for example. If you like them, fine. If not, tell us. But first, there are some popular misconceptions about magazines being omnipotent or psychic or something. We wish writing and editing were as easy as that. But it isn't.

For instance, sometimes we get complaints for failing to list an item in our well-read calendar.

We have had complaints from principals in the news, or in controversies. They claim that because we merely reported this side or that side, or even both sides, that we were **taking** sides. Our job is to report developments, not to imply any opinions except on this editorial page.

Or maybe someone tells us, as they tell most publications, that we don't have the whole story. Well, we always **try** to get the whole story.

And there are companies who berate us for not having run a big story on the newest product they are readying for the market and we ask them if they let us know about it and maybe it develops that they have failed to tell anyone outside the plant yet.

We've had wails, too, that we didn't print anything at all about an event or product and we finally learn after some close questioning that the complaining party just didn't happen to see the particular issue that ran the story.

Here are a few tips; you can think of more:

If you're connected with an event and want to be sure it's publicized, tell us about it, soon as possible.

If you want us to be sure to know your special side of a matter, or your story, tell us. Don't wait.

If you think you've been wronged, write us. We try to assure fair play by offering space in our Letters columns.

If you want us to know about your new product, alert us as much in advance as possible, so we can decide if we should reserve space for a story on the date you select for official release.

If you are an alert and savvy public relations man and you believe you have a legitimate reason for asking us to defer publication of a story, have enough confidence in us to explain the situation. No reporter or editor of integrity will violate an "off the record" talk under those circumstances. Many a publicist could have prevented damaging stories from appearing if he had taken a few influential editors into his confidence and explained how much—that would never appear on the surface—was really at stake.

These are a few tips on how you as important aviation business men can help us help you.

Now, as readers, if you want more of one kind of information and less of something else, tell us and we'll either set the wheels moving to change things, or tell you why we can't.

More Comment on Pullman

More letters from airline leaders, reprinted below, have been received since last week's issue went to press. All comment on an editorial here concerning a controversial ad for the Pullman Co.

Thank you for your thoughtfulness in sending us a copy of your editorial which, of course, is quite a good one. The railroads have reached a rather low level of morality in their advertising.

C. R. SMITH, President
American Airlines, Inc.
New York, N. Y.

Thanks for sending me a copy of your editorial of June 26, which I had already seen and read with interest.

There seems to be a lot of mixed emotions in our industry, but everyone agrees with you that the Pullman ad was not up to high ethical standards. Also, I think a number of people, including me, felt that your own editorial was excellent for the first two-thirds of the first column, but after that (when you started bringing in Young & Rubicam and their other clients) we thought you got back to fighting fire with fire.

Maybe, sometimes one has to—as I recently did it in a talk in Los Angeles. I don't like it and probably you don't either!

R. S. DAYTON, President
Trans World Airlines
Kansas City, Mo.

Your very thoughtful note to Slim Carmichael with the enclosed editorial concerning "Pullman's Vicious Ad," was sent to my office as Slim had left for a month's vacation with his family—incidentally, the first one in three years!

I know that if he were here, he would write you as I am doing now and tell you we think it is outstanding in every respect. Your editorial policy has been one of the very fine things in our industry.

We need someone with fearlessness who doesn't hesitate to step out of line sometimes to say what must be said despite any effect it may have on some special interest.

HAYES DEVER, Secretary and Director
of Public Relations
Capital Airlines
Washington, D. C.

It is this kind of writing that does much to help us along in this business.

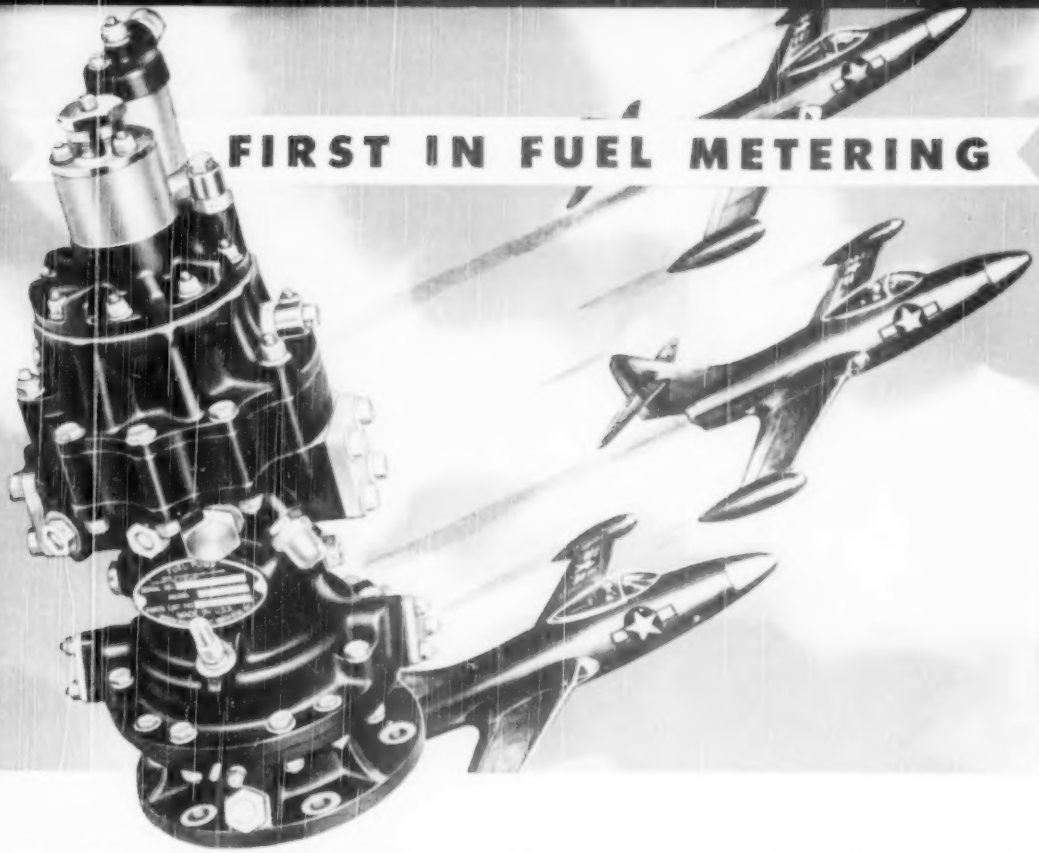
AMOS CUTLER, Vice President-Sales
Northwest Airlines, Inc.
St. Paul, Minnesota

Tide magazine in its July 14 issue devoted about two columns to a story about AVIATION WEEK'S *editorial. It also reproduced the controversial Pullman ad. It reported:*

"Y & R (Young & Rubicam) spokesmen denied the Pullman ad was aimed particularly at air travel, and stated that Pullman had been running a series stressing 'safety dependability and comfort' for about four years and will continue to emphasize the same theme."

On June 9 before the editorial appeared in the issue of June 26, AVIATION WEEK *telegraphed the advertising agency our opinion of the ad in question and offered an opportunity for comment. An agency spokesman telephoned us later and said Pullman had been preaching safety for some time and the ad in question was merely part of that campaign.*

—ROBERT H. WOOD



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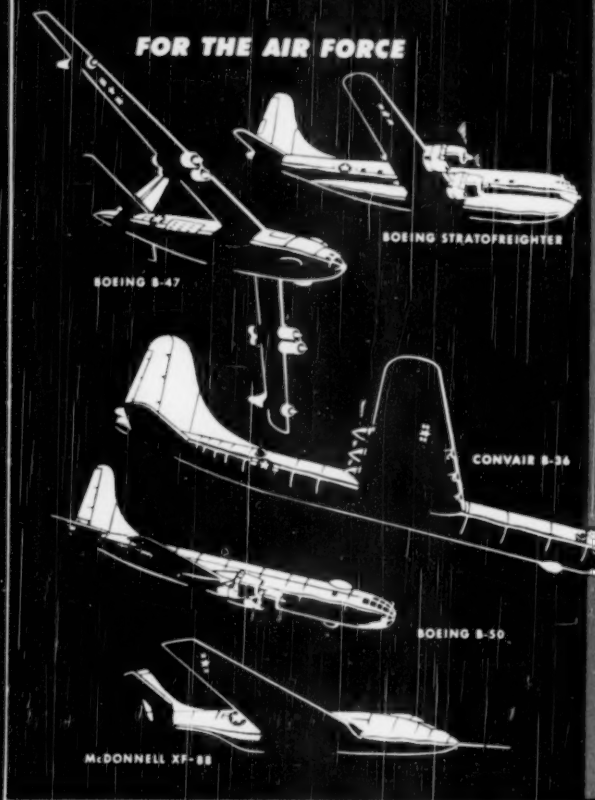

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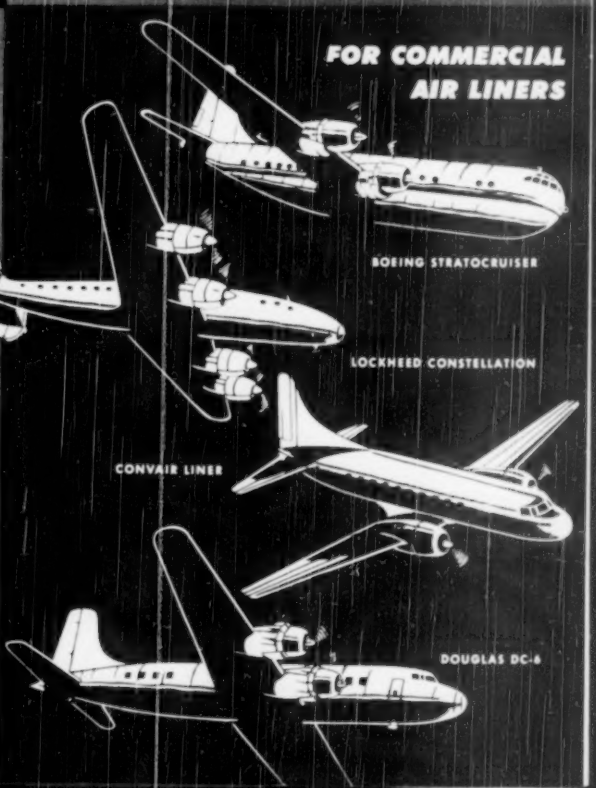
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